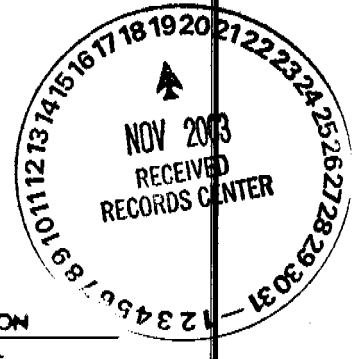
# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

# Building 707 Closure Project Decommissioning Operations Plan

## Revision 0
## December 21, 2000

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# RECORD OF MODIFICATIONS

| DOP Modification # | Effective Date | Description |
|---|---|---|
| Revision 0 | January 18, 2001 | |

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# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| **AB** | authorization basis |
| **ACM** | asbestos-containing material |
| **ALARA** | as low as reasonably achievable |
| **Am** | americium |
| **ANSI** | American National Standards Institute |
| **APEN** | Air Pollutant Emission Notice |
| **AR** | Administrative Record |
| **ARARs** | applicable or relevant and appropriate requirements |
| **ASQC** | American Society of Quality Control |
| **AST** | aboveground storage tank |
| **Be** | beryllium |
| **BIO** | Basis for Interim Operation |
| **CA** | Contamination Area |
| **CAQCC** | Colorado Air Quality Control Commission |
| **CCA** | Configuration Control Authority |
| **CCR** | Code of Colorado Regulations |
| **CDPHE** | Colorado Department of Public Health and Environment |
| **CERCLA** | Comprehensive Environmental Response, Compensation and Liability Act |
| **CFR** | Code of Federal Regulations |
| **CHWA** | Colorado Hazardous Waste Act |
| **CHWR** | Colorado Hazardous Waste Regulations |
| **CID** | Cumulative Impacts Document |
| **cm** | centimeter |
| **$cm^2$** | square centimeter |
| **$CO_2$** | carbon dioxide |
| **COOP** | Conduct of Operations |
| **CPB** | Closure Project Baseline |
| **D&D** | deactivation and decommissioning |
| **DDCP** | Decontamination and Decommissioning Characterization Protocol |
| **DNFSB** | Defense Nuclear Facilities Safety Board |
| **DOE** | U.S. Department of Energy, Rocky Flats Field Office |
| **DOP** | Decommissioning Operations Plan |

| | |
|---|---|
| **DOT** | U.S. Department of Transportation |
| **dpm** | disintegrations per minute |
| **DPP** | Decommissioning Program Plan |
| **DQO** | data quality objective |
| **EAWL** | Emergency Action Work Log |
| **EDE** | effective dose equivalent |
| **EIS** | Environmental Impact Statement |
| **EPA** | U.S. Environmental Protection Agency |
| **ER** | environmental restoration |
| **ES&H** | environmental safety and health |
| **FDPM** | Facility Disposition Program Manual |
| **FUD** | Facility Use Decision |
| **FY** | fiscal year |
| **HASP** | Health and Safety Plan |
| **HDIT** | Hazard and Discipline Identification Tool |
| **HVAC** | heating, ventilation, and air conditioning (system) |
| **IA SAP** | Industrial Area Sampling and Analysis Plan |
| **IGD** | RFCA Implementation Guidance Document |
| **IHA** | Integrated Hazards Analysis |
| **IHSS** | Individual Hazardous Substance Site |
| **IM/IRA** | Interim Measure/Interim Remedial Action |
| **ISMS** | Integrated Safety Management System |
| **ISSRS** | In-Situ Size Reduction System |
| **ITDC** | Inner Tent Demolition Chamber |
| **IV** | independent verification |
| **IWCP** | Integrated Work Control Program |
| **JHA** | Job Hazards Analysis |
| **LDR** | Land Disposal Restrictions |
| **LL** | low-level (waste) |
| **LLM** | low-level mixed (waste) |
| **LOQI** | list of qualified individuals |
| **LRA** | lead regulatory agency |
| **µg/l** | micrograms per liter |

| | |
|---|---|
| **MOU** | Memorandum of Understanding |
| **mrem** | millirem |
| **MSDS** | Material Safety Data Sheet |
| **NA** | not applicable |
| **nCi** | nanocurie |
| **NEPA** | National Environmental Policy Act |
| **NESHAPs** | National Emission Standards for Hazardous Air Pollutants |
| **NPDES** | National Pollutant Discharge Elimination System |
| **NSD** | new source detection (air monitoring) |
| **NTS** | Nevada Test Site |
| **OPWL** | original process waste lines |
| **ORR** | Operational Readiness Review |
| **OS&IH** | occupational safety & industrial hygiene |
| **OSHA** | Occupational Safety and Health Act |
| **PA** | Protected Area |
| **PAC** | Potential Area of Concern |
| **PAM** | Proposed Action Memorandum |
| **PCBs** | polychlorinated biphenyls |
| **PDS** | pre-demolition survey |
| **PDSR** | Pre-Demolition Survey Report |
| **PEB** | pre-evolution briefing |
| **PMP** | Project Management Plan |
| **POC** | point of contact |
| **POD** | pan of the day |
| **POW** | plan of the week |
| **PPE** | personal protective equipment |
| **ppm** | parts per million |
| **psi** | pounds per square inch |
| **Pu** | plutonium |
| **PU&D** | property use and disposition |
| **PuSPS** | Plutonium Stabilization and Packaging System |
| **QA** | quality assurance |
| **RA** | Readiness Assessment |

| | |
|---|---|
| **RAAMP** | Radioactive Ambient Air Monitoring Program |
| **RCRA** | Resource Conservation and Recovery Act |
| **RDM** | Readiness Determination Manual |
| **rem** | radiation equivalent man |
| **RFCA** | Rocky Flats Cleanup Agreement |
| **RFCAB** | Rocky Flats Citizens Advisory Board |
| **RFCLOG** | Rocky Flats Coalition of Local Governments |
| **RFETS** | Rocky Flats Environmental Technology Site |
| **RISS** | Remediation, Industrial Area D&D, and Site Services (Project) |
| **RLC** | reconnaissance level characterization |
| **RLCP** | Reconnaissance Level Characterization Plan |
| **RLCR** | Reconnaissance Level Characterization Report |
| **ROSRS** | Remote Operated Size Reduction System |
| **RSOP** | RFCA Standard Operating Protocol |
| **RWP** | radiological work permit |
| **SCO** | surface-contaminated object |
| **SES** | safety evaluation screen |
| **SHPO** | State Historic Preservation Officer |
| **SME** | subject matter expert |
| **SNM** | special nuclear material |
| **SOE** | stationary operating engineer |
| **SPCC** | Spill Prevention, Control, and Countermeasures (Plan) |
| **SQAM** | Site Quality Assurance Manual |
| **STP** | Site Treatment Plan |
| **TBD** | to be determined |
| **Th** | thorium |
| **TPH** | total petroleum hydrocarbons |
| **TRM** | transuranic mixed (waste) |
| **TRU** | transuranic (waste) |
| **TSCA** | Toxic Substances Control Act |
| **TSD** | treatment, storage, disposal (facility) |
| **TU** | (RCRA) temporary unit |
| **U** | Uranium |

| | |
|---|---|
| **UBC** | under building contamination |
| **UCNI** | Uncontrolled Classified Nuclear Information |
| **USQ** | Unreviewed Safety Question |
| **USQD** | Unreviewed Safety Question Determination |
| **UST** | underground storage tank |
| **VOC** | volatile organic compound |
| **WAC** | waste acceptance criteria |
| **WCD** | work control document |
| **WIPP** | Waste Isolation Pilot Plant |
| **WPF** | Work Process Form |

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# EXECUTIVE SUMMARY

The Building 707 Closure Project is comprised of Buildings 707, T-707S, 708, 709, 711, 711A, 718, 731, 732, 778, and 21 aboveground storage tanks (ASTs), all of which are located within the Protected Area (PA) of the Rocky Flats Environmental Technology Site (RFETS or Site). Closure of facilities within the Building 707 Closure Project is necessary to meet the goals of the Rocky Flats Cleanup Agreement (RFCA) and the Rocky Flats Closure Project Baseline (CPB).

Buildings within the Building 707 Closure Project were constructed in the 1970s to house manufacturing processes designed to produce weapons parts from plutonium, uranium, beryllium, and stainless steel. Hazards associated with the related casting, forming, metallurgy, machining, and assembly operations included radiological and chemical contamination on building surfaces and in building equipment and systems, and physical hazards common to standard industrial environments. Some areas within the Building 707 Closure Project have levels of radiological contamination exceeding 2,000 disintegrations per minute (dpm) per square centimeter ($cm^2$) removable and 50,000 dpm/100 $cm^2$ fixed plus removable. In addition, asbestos-containing material (ACM) is present in ceiling tile, floor tile, and insulation; beryllium contamination has been found in gloveboxes and other equipment; and organic solvents reside in tanks and ancillary equipment.

With suspension of nuclear weapons production operations at the Site in 1989, and subsequent discontinuation of the production mission in 1991, activities in Building 707 were re-directed to support the Rocky Flats Vision of safe, accelerated, cost-effective closure. In accordance with the current decommissioning schedule for the Building 707 Closure Project, facility components will be decontaminated, size reduced, and/or removed from the buildings and the buildings will be demolished by June of 2005. At that time environmental restoration (ER) activities will be undertaken to remediate any soils, groundwater, and/or surface water contaminated as a result of building operations.

For planning purposes, the Building 707 Closure Project was divided into small, manageable groupings of similar equipment and rooms that can be worked independently. A total of 17 groups, or Sets, were defined for the Project. Next, the Sets were prioritized to establish the order in which they will be decommissioned, taking into account such factors as physical constraints, personnel and environmental safety and health (ES&H), operational/technical issues, management issues, costs, and waste generation issues. The RFETS Decontamination and Decommissioning Characterization Protocol (DDCP) was then used to complete a reconnaissance level characterization (RLC) for each Set. Results were documented in the Building 707 Closure Project Reconnaissance Level Characterization Report (RLCR), which identifies the presence of radiological and chemical contamination in many of the Sets. Following the RLC, component removal, size reduction, decontamination, and demolition methodologies were examined to complete the development of the decommissioning sequence.

In accordance with the RFETS Decommissioning Program Plan (DPP), buildings with significant contamination or hazards (i.e., Type 3 buildings) and buildings without significant contamination or hazards, but in need of decontamination (i.e., Type 2 buildings), will be decommissioned in accordance with this Decommissioning Operations Plan (DOP). Buildings that are free of contamination (i.e., Type 1 buildings) will be decommissioned using Site procedures upon notification to the Lead Regulatory Agency (LRA), (i.e., the Colorado Department of Public Health and Environment [CDPHE]). Based upon their review of the RLCR, the U.S. Department of Energy, Rocky Flats Field Office (DOE) and CDPHE concur that Building 707 is a Type 3 facility; Buildings 708, 709, 718, 731, 732, 778, and one of the ASTs (i.e., Tank T-206/D-2, containing carbon tetrachloride) are Type 2 facilities; and the remaining buildings and tanks located within the Building 707 Closure Project are classified as Type 1 facilities. Therefore, the scope of this DOP is limited to Buildings 707, 708, 709, 718, 731, 732, 778 and Tank T-206/D-2.

Consistent with the objectives of RFCA, the Building 707 Closure Project team will select decommissioning techniques based on a variety of factors, including potential ES&H hazards, secondary waste generation, and cost-effectiveness. Performance specifications for the techniques will include meeting the applicable release criteria and waste acceptance criteria (WAC) of the receiving treatment, storage, disposal (TSD) facilities; minimizing the generation of hazardous, radioactive and secondary wastes; minimizing ES&H impacts; and complying with the applicable or relevant and appropriate requirements (ARARs).

The Building 707 Closure Project team will perform decommissioning activities upon completion of appropriate reviews in compliance with Site programs and procedures, including the RFETS Integrated Safety Management System (ISMS), which incorporates the Site Integrated Work Control Program (IWCP), Readiness Determination Program, Environmental Management Program, and Quality Assurance Program. Site requirements will be applied based on a graded approach (i.e., more rigorous requirements will be applied to facilities with greater hazards). In addition, personnel and environmental monitoring systems will be used, including Site-wide and project-specific air, surface water, and groundwater monitoring systems as described in the Site Integrated Monitoring Plan (IMP).

Environmental impacts resulting from the Building 707 Closure Project will contribute incrementally to potential Site-wide cumulative impacts associated with the overall RFETS Closure Project. Given the existing industrial setting of the Building 707 and associated facilities, environmental impact issues associated with the Building 707 Closure Project are relatively limited.

Throughout the course of the Building 707 Closure Project, personnel of the DOE, the contractor, and the regulatory agencies (i.e., CDPHE and the Environmental Protection Agency [EPA]) will use the RFCA consultative process to establish and maintain effective working relationships with each other and with the general public. Decommissioning activities will be documented in the Building 707 Closure Project Files, RCRA Operating Record, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Administrative Record (AR) File. Upon completion of decommissioning activities and final characterization, a Building 707 Closure Project Decommissioning Final Closeout Report will be prepared for review and approval by the LRA.

# 1.0 INTRODUCTION

In 1996, the U.S. Department of Energy, Rocky Flats Field Office (DOE), the Environmental Protection Agency (EPA), and the Colorado Department of Public Health and Environment (CDPHE) executed the Rocky Flats Cleanup Agreement (RFCA).[1] RFCA is the Federal Facility Compliance Agreement and Consent Order negotiated pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)[2], the Resource Conservation and Recovery Act (RCRA)[3], and Colorado Hazardous Waste Act (CHWA).[4] RFCA provides the regulatory framework for attaining the goals expressed in the Rocky Flats Vision.[5]

The overriding goal for Rocky Flats is to achieve accelerated cleanup and Site closure in a manner that is safe to workers and the public, and protective of the environment. As discussed in the Rocky Flats Closure Project Management Plan[6], DOE intends to disposition all special nuclear material (SNM) and regulated wastes, demolish facilities, and remediate contaminated areas to the extent that future land uses are enabled and downstream water supplies are protected. Site closure is currently scheduled for completion in December of 2006.

## 1.1 Alternatives Analysis and Selection

To determine the most efficient path to accelerated cleanup and Site closure, the RFETS Facilities Use Committee was tasked with evaluating three alternatives for the near- and long-term management of RFETS facilities[7]:

- Alternative 1 - Decommissioning (i.e., component removal, size reduction, decontamination, and demolition),
- Alternative 2 - No action with safe shutdown maintenance (i.e., mothballing), and
- Alternative 3 - Facility reuse.

The results of this analysis are summarized in Table 1. As discussed in the Facility Assessment for the Industrial Area Reuse Study[8], Alternative 3 is neither required nor beneficial because Site cleanup and closure would be deferred but not eliminated. Similarly, Alternative 2 fails to accomplish the Rocky Flats Vision, resulting in an increase in the life-cycle costs associated with Site cleanup and closure.

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1 Final Rocky Flats Cleanup Agreement (RFCA), Federal Facility Agreement and Consent Order (CERCLA VIII-96-21, RCRA 3008[h] VIII-96-01, State of Colorado Docket 96-07-19-01), July 19, 1996.

2 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9620 *et seq.*

3 Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments Act (HSWA) and the Federal Facility Compliance Act (FFCAct), 42 USC 6901 *et seq.*

4 Colorado Hazardous Waste Act (CHWA), CRS 25-15-101 *et seq.*

5 The Rocky Flats Vision is contained in Appendix 9 of RFCA.

6 Rocky Flats Closure Project Management Plan, Rev. 4, October 6, 1999.

7 The terms "building" and "facility" are used interchangeably in this DOP.

8 Facility Assessment for the Industrial Area Reuse Study, December 8, 1997.

# Table 1. Alternatives Analysis Summary

| Alternative | Description | Effectiveness | Feasibility | Relative Cost |
|---|---|---|---|---|
| 1-Decommissioning | Decommissioning activities will be performed in accordance with RFCA decision documents approved by DOE and CDPHE or EPA. Activities will include (as necessary) post-deactivation decontamination, component removal, size reduction, and demolition of building structures, as well as waste generation. | Decommissioning is effective in achieving the long-term goals of the Rocky Flats Vision. Buildings are decontaminated and demolished to three feet below the proposed final grade; underground structures are removed and/or stabilized; mortgage costs are eliminated; risks to workers and the environment are reduced. | Technology currently exists to achieve the objectives of this alternative, both technically and administratively. Integration with other Site activities (e.g., waste storage capacity) can be accomplished. | Decommissioning results in the lowest life-cycle costs. Once decommissioning is achieved, minimal landlord costs will be incurred. |
| 2 – No action with safe shutdown maintenance (i.e., "mothballing") | RFETS buildings will be maintained in their current configuration. No additional equipment will be removed unless the present safe shutdown status of the buildings is compromised. | No action delays closure activities that must be performed to meet the long-term goals of the Rocky Flats Vision. This alternative is also effective in achieving the near-term goal identified in the RFCA preamble (Objective #7). Deferring decommissioning could make funding available for other removals. However, long-term goals may be jeopardized if the structural integrity of the mothballed facilities increases risk to workers and the environment. | Administratively, this alternative is not ideally implementable because the integrated Site-wide baseline is based on the decommissioning of all RFETS facilities. No Action could disrupt the long-term goals for RFETS. | The No action alternative has the life-cycle costs of decommissioning (adjusted for future value) plus the landlord/surveillance costs necessary to maintain a mothballed facilities (structural continuity, fire prevention, etc) until demolition. |
| 3 – Reuse | A new mission will be assigned by the Site Facilities Use Committee. Utilities and equipment will be maintained in their current configuration until the new mission is defined. Depending on the nature of the new mission, some equipment may need to be removed. | Facility reuse was evaluated by the Site Facility Use Committee in accordance with DOE Order 430.1A, Disposal of Government-Owned Land Improvements. No future use was identified. | Because no new mission has been identified for RFETS facilities, and because the Site-wide integrated baseline is based on the decommissioning of all RFETS facilities in the near future, implementation of this alternative is neither feasible nor reasonably foreseeable at this time. | This alternative results in the greatest life-cycle costs. Facilities will require modification prior to reuse and landlord/surveillance costs will continue to be incurred. Once the new mission has expired, the facilities will still need to be decommissioned. |

The alternatives were evaluated for potential impacts on the human environment (i.e., air, surface water, groundwater, soils, plants and animals, historic resources, and the socioeconomics of surrounding communities). Alternative 1 is the selected alternative because decommissioning supports the Rocky Flats Vision of safe, accelerated, cost-effective closure. This alternative also maintains long-term protection of public health and the environment. By removing RFETS facilities and associated contamination, risks posed by the Site will be reduced and/or eliminated.

## 1.2 Decommissioning Under the Rocky Flats Cleanup Agreement

The regulatory approach to decommissioning is presented in the RFETS Decommissioning Program Plan (DPP)[9]. The Facility Disposition Program Manual (FDPM)[10] establishes the RFETS internal requirements for planning and executing decommissioning activities, including preparation of a Project Management Plan (PMP)[11]. The PMP documents planning activities for the entirety of each RFETS closure project, including deactivation and decommissioning.

The decommissioning process begins with internal and external scoping meetings, at which the individual points of contact (POCs) from DOE, the contractor, and the lead regulatory agency (LRA) engage the RFCA consultative process to discuss the scope of the decommissioning project.[12] Reconnaissance level characterization (RLC) is then performed to identify radiological, chemical, and physical hazards. Results are summarized in the Reconnaissance Level Characterization Report (RLCR). The RLCR provides the basis for determining building types.

As described in the DPP, buildings are typed based on levels of contamination. Buildings classified as Type 1 are free of contamination; Type 2 buildings do not have significant contamination or hazards, but need some level of decontamination; and Type 3 buildings have significant contamination and/or hazards. Different RFCA decision documents may be used to decommission each type of building. The DPP serves as the RFCA decision document for Type 1 buildings; thus decommissioning activities may be performed using RFETS procedures upon notification of the LRA. Type 2 buildings require a separate RFCA decision document in the form of a Proposed Action Memorandum (PAM), Interim Measure/Interim Remedial Action (IM/IRA), or RFCA Standard Operating Protocol (RSOP), or they may be included with Type 3 buildings in an approved Decommissioning Operations Plan (DOP).

Additional characterization may be conducted during decommissioning as facility components are removed and building surfaces are exposed. This type of characterization is referred to as "in-process characterization." Data from in-process characterization is used to identify additional hazards; refine approaches to facility component removal, size reduction, decontamination, and demolition; revise waste volume estimates; and modify environmental safety and health (ES&H) controls, as necessary. In-process characterization is also conducted to determine the type and extent of decontamination, and to verify that the applicable decontamination goals and waste acceptance criteria (WAC) of the receiving TSD facilities have been met. In addition, a pre-demolition survey (PDS) is conducted prior to demolition to ensure that buildings have been sufficiently decontaminated to meet applicable performance specifications. The PDS is conducted in accordance with the requirements of the RFETS Pre-Demolition Survey Plan (PDSP).[13] The types of data required to meet the objectives of the PDS include total surface contamination measurements, removable surface contamination measurements, and scan data. Additional

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9 RFETS Decommissioning Program Plan , (latest revision)

10 RFETS Facility Disposition Program Manual, MAN-076-FDPM, Revision 1 (September 24, 1999).

11 The Project Management Plan (PMP) will replace the Project Execution Plan (PEP) in the next revision to the FDPM.

12 The consultative process is described in Part 7 of RFCA (¶¶51-61) and in Section 1.1.1 of the DPP.

13 The RFETS PDSP is currently in draft form and undergoing review by the regulators and other stakeholders. It will not be invoked for the Building 707 Closure Project until it has been approved by the LRA.

information required to design the PDS includes in-process survey data and updated building maps that reflect any structural alterations. In-process surveys are performed to assess changing radiological conditions during the course of decommissioning and to confirm that an area is free of gross contamination. Survey data from the PDS are documented in the PDS Report (PDSR). The RFETS Decontamination and Decommissioning Characterization Protocol (DDCP)[14], contains detailed information concerning the characterization process and provides guidance for establishing appropriate data quality objectives (DQOs) and assessing data quality.

Figure 1 summarizes the relationships between RFETS Closure Project documents and drivers, individual closure project characterizations, decision documents, and reports, including the use of four RSOPs: the RSOP for Recycling Concrete; the RSOP for Facility Component Removal, Size Reduction and Decontamination Activities; the RSOP for Facility Disposition; and the RSOP for ER.[15] This figure shows the major closure activities, including preparation of key documents and interfaces between the three elements of Site closure (i.e., deactivation, decommissioning, and ER).

While the regulatory processes and documentation for decommissioning and ER are separate, these two major elements of facility closure interface at various points in the closure process (e.g., they share common elements of the various environmental monitoring programs), and will sometimes occur concurrently in a building or building cluster. The Industrial Area Characterization and Remediation Strategy[16] describes the interfaces within the Industrial Area. Before, during, and after facility component removal, size reduction, and decontamination activities, ER subject matter experts (SMEs) will characterize under building contamination (UBC) and surrounding soils, as appropriate. Characterization activities will be described in the Environmental Restoration Industrial Area Sampling and Analysis Plan (IA SAP). Integration of the decommissioning and ER elements of the Building 707 Closure Project is described in the Building 707 Closure Project Management Plan (PMP).

DOE is currently considering the long-term stewardship issues associated with decommissioning and ER activities, including long-term monitoring to ensure RFCA objectives are being met. Pursuant to a requirement in the Fiscal Year (FY) 2000 National Defense Authorization Act, DOE is preparing a report to Congress providing details on the cost, scope, and schedule of its management and stewardship responsibilities at these facilities. Pursuant to the terms of a settlement agreement reached in 1998, DOE is also preparing a long-term stewardship study, which will examine the institutional and programmatic issues facing DOE at RFETS and other facilities within the DOE Complex. These documents will be placed in the RFETS Reading Rooms when they become available.[17]

## 1.3 Scope and Purpose

The purpose of this DOP is to describe the decommissioning process for the Type 2 and 3 buildings within the Building 707 Closure Project. As discussed in the DPP, Building 707 has been identified as a Type 3 building. As determined by the RLC and reported in the RLCR, there are seven Type 2 facilities, Buildings 708, 709, 718, 731, 732, 778, and one outdoor tank. The remaining facilities are Type 1 facilities and are therefore not included within the scope of this DOP.

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[14] Rocky Flats Environmental Technology Site Decontamination and Decommissioning Characterization Protocol, MAN-077-DDCP (latest revision).

[15] Due to timing issues associated with approval of the RSOP for Facility Disposition and RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities, the requirements contained in these two RSOPs have been incorporated directly into this DOP. The RSOP for Recycling Concrete, and RSOP for ER Activities have been incorporated by reference. The RSOP for ER Activities, and any other RSOPs developed throughout the course of decommissioning, will not be invoked until they have been approved by the LRA.

[16] Rocky Flats Environmental Technology Site Industrial Area Characterization and Remediation Strategy (latest revision).

[17] Additional information on long-term stewardship is available online at www.em.doe.gov/lts.

The DOP is arranged in 11 sections. Project organization, roles and responsibilities, and interfaces with the regulators and other stakeholders are discussed in Section 2.0. The Building 707 Closure Project, its operational history, and current status are described in Section 3.0. The project approach, performance specifications, and measures employed to protect worker health and safety and the environment are described in Section 4.0, as are the special challenges associated with removal of Building 707's network of chainveyors, ventilation and filtration systems, and contaminated portions of the building shell. Waste management is discussed in Section 5.0, closure options for the RCRA-regulated units are presented in Section 6.0, and the anticipated environmental consequences are described in Section 7.0. The applicable or relevant and appropriate requirements (ARARs) are presented in Section 8.0, a current project schedule is provided in Section 9.0, records management is discussed in Section 10.0, and the comment responsiveness summary is contained in Section 11.0.

Figure 1. Major Closure Activities & Associated Documents

# 2.0 PROJECT ORGANIZATION

This section provides a brief description of the Building 707 Closure Project organization structure, functions, and interfaces as they pertain to facility management and decommissioning. This information is being supplied to identify reporting relationships and responsibilities. The organizational structure is not an enforceable part of the DOP, and DOE or its contractor may alter the structure without prior notification to or approval of the LRA. Significant organization changes (e.g., management-level changes) will be shared with the LRA as part of the RFCA consultative process.

## 2.1 Project Team Organization Structure

The Building 707 Closure Project will function under an integrated scope, schedule, and cost control system that identifies roles, responsibilities, and interfaces. The project organization is described below and depicted in Figure 2.

- **Building 707 Closure Project Management** – Accountable for the safe planning, execution, and successful completion of the Building 707 Closure Project in accordance with applicable standards and requirements.
- **Engineering, Environment, Safety, Health & Quality (EESH&Q)** – Provides program, policy, and regulatory guidance to the Facility Management, Ash/Dry Residues Project, and Facility Disposition organizations; performs inspections; manages radiological operations; coordinates assessments; collects, tracks, and trends Closure Project EESH&Q metrics; and provides engineering services and planning support to the Closure Project team.
- **Administrative Services** – Provides support in the area of human relations and labor relations; assists the Closure Project Manager in resource allocation planning; manages the Building 707 Closure Project training program; administers the employee compensation program; prepares Closure Project occurrence reports; and provides miscellaneous project administrative support (e.g., document preparation, control, and maintenance).
- **Project Planning, Controls, Contracts, and Procurement** – Develops Closure Project schedules; identifies resource requirements; maintains the Building 707 Closure Project PMP; manages the Closure Project change control process; monitors and reports Closure Project performance; manages work control, including plan of the day (POD) and plan of the week (POW); administers subcontracts and task orders; and purchases equipment and supplies required to support Closure Project activities.
- **Facility Management** – Operates and maintains the Building 707 and associated facilities to support Closure Project activities; ensures compliance with the Building 707 Basis for Interim Operations (BIO); maintains facility safety category systems (e.g., criticality, fire, ventilation); releases/authorizes work; conducts facility surveillances; maintains facility security; manages facility emergency preparedness; conducts RCRA inspections; and maintains RCRA compliance.
- **Ash/Dry Residues Project** – Sorts, sieves, size-reduces, blends, and repackages the Site's remaining inventory of plutonium-contaminated ash and dry residues to meet shipping and disposal requirements; destroys and repackages inorganic combustibles and classified shapes (i.e., "dry" residues) to meet interim safe storage criteria, and shipping and disposal requirements.

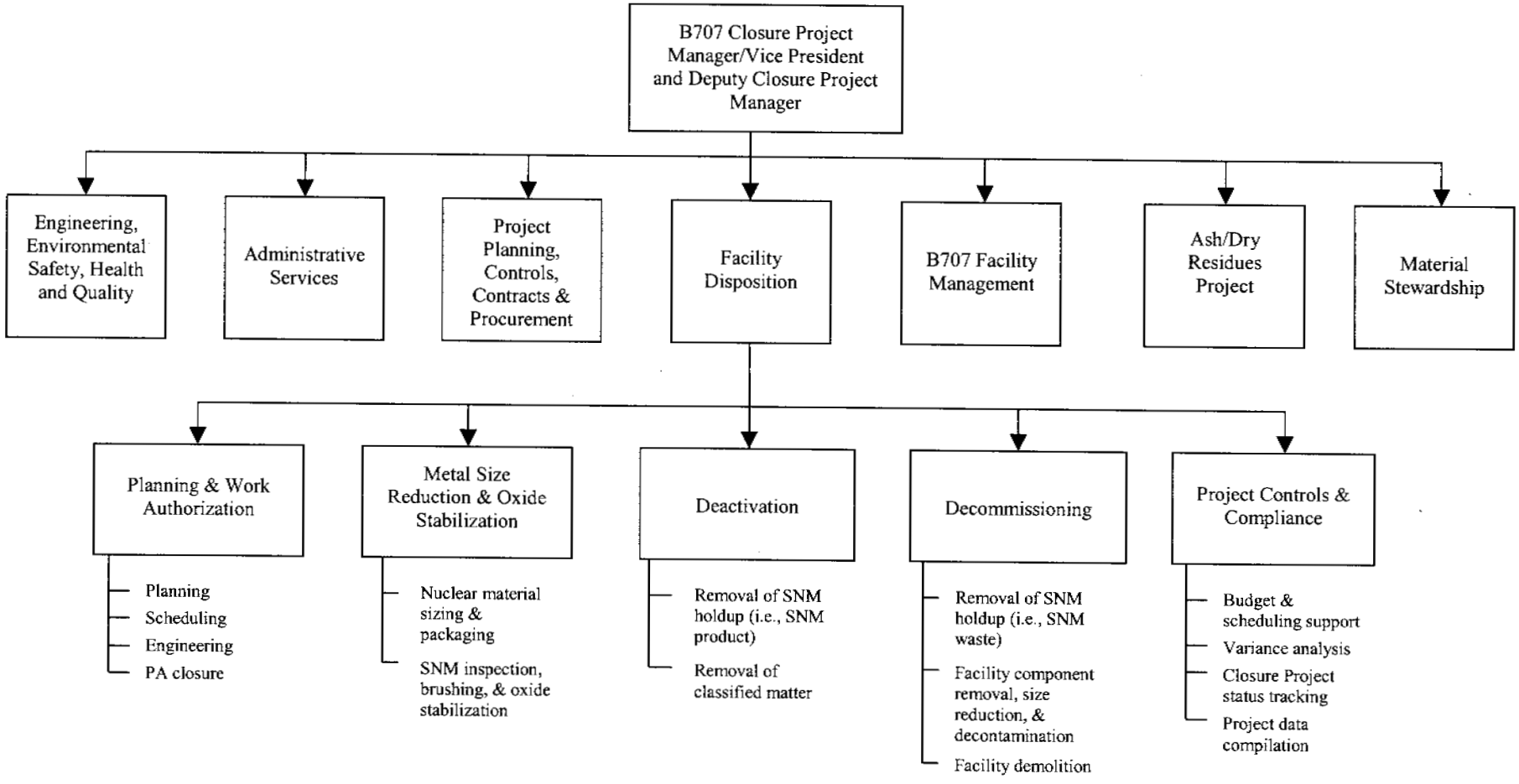


Figure 2. Building 707 Closure Project Organization

- **Facility Disposition** – Accountable for the planning and execution of metal sizing and oxide stabilization activities, deactivation activities, and decommissioning activities.
  - Planning and Work Authorization: Provides planning, start-up, and technical support for required activities. Functions include routine planning, scheduling, engineering, and operations support tasks (e.g., preparation of IWCP work packages, procedures, and property disposition); PA closure; deactivation scheduling and execution; decommissioning planning and execution; and demolition planning and execution.
  - Project Controls and Compliance: Provides budget and scheduling support, develops data necessary to support the RFETS 2006 Plan[18], performs variance analysis, and tracks Closure Project status.
  - Metal Size Reduction/Oxide Stabilization: Performs nuclear material sizing and preliminary packaging for off-Site transfer; conducts SNM inspection, brushing, and oxide stabilization activities, including feed material preparation for transfer to the Plutonium Stabilization and Packaging System (PuSPS) in Building 371.
  - Deactivation: Responsible for the removal of SNM holdup and "loose" materials, such as combustibles, furniture, and waste chemicals; preparation of gloveboxes for decommissioning; removal of organic liquids from equipment and systems; removal of classified material/tooling; and removal glovebox line- and non-line generated material.
  - Decommissioning: Responsible for the removal, size reduction, and decontamination of facility components and for facility demolition, as described in this DOP.
- **Material Stewardship** – Provides commodities to support Closure Project needs; manages regulated wastes and coordinates inter-building material movements through facility disposition; provides nuclear material safeguards support (e.g., SNM inventory, assay, and accounting); and provides non-destructive assay services.

## 2.2 Project Team Interfaces

As owner of the Site, DOE oversees closure operations; provides input to the contractor regarding funding and overall direction; and communicates with the regulators and other stakeholders (e.g., the Rocky Flats Citizens Advisory Board [RFCAB], the Rocky Flats Coalition of Local Governments [RFCLOG], and the public) regarding the status of the Building 707 Closure Project. In addition, DOE is responsible for the enforcement of health and safety provisions of certain federal regulations (e.g., Occupational Safety and Health Act [OSHA] requirements).

CDPHE is the LRA for the Industrial Area, and thus is the LRA for decommissioning activities conducted pursuant to RFCA. EPA is the support regulatory agency (SRA) in the Industrial Area. As a result, both CDPHE and EPA participate in oversight of decommissioning activities at RFETS. The Defense Nuclear Facilities Safety Board (DNFSB) oversees the storage of source, SNM, and byproduct material and radioactive wastes not subject to CDPHE or EPA regulation. CDPHE, EPA, and the DNFSB have executed a Memorandum of Understanding (MOU) with DOE to define their respective roles and responsibilities for oversight of activities conducted in the Industrial Area.[19]

[18] Rocky Flats Environmental Technology Site Closure Project Management Plan (latest revision).

[19] Memorandum of Understanding Governing Regulation and Oversight of Department of Energy Activities in the Rocky Flats Environmental Technology Site Industrial Area (IA), executed February 15, 1996.

## 2.3 Working Relationships

The personnel of DOE, its contractor and subcontractors, and the regulators (i.e., CDPHE, EPA) will use the RFCA consultative process[20] to establish and maintain effective working relationships with each other and with the general public throughout the decommissioning process. As described in the DPP, the principal aspects of the consultative process are as follows:

- **Timely Sharing of Information** – Information sharing efforts may include but need not be limited to: updates of the overall Site closure baseline, briefings on the development of work plans; briefings on changes to approved baselines, periodic project status briefings, and consultations on decommissioning strategy.
- **Collaborative Discussions of Program Changes** – The goal of these collaborative discussions is to raise and resolve issues without delaying decommissioning activities.
- **Designation and Use of Project Points of Contact for Information Exchange and Resolution of Issues** – The LRA and DOE will designate POCs to facilitate open communication and resolution of issues. In addition, DOE will provide POC designations for its contractor.
- **Respect for the Roles and Responsibilities of the Parties** – The LRA and DOE will have distinct roles and independent decision-making responsibilities. In general, the role of DOE is to oversee program and Closure Project planning, and to approve the CPB and baseline changes. The role of the LRA is to approve the DOP and other RFCA decision documents, oversee the planning and implementation of work, ensure protection of human health and the environment, and monitor compliance with RFCA and Closure Project ARARs.
- **Training** – To facilitate the consultative process, the LRA and DOE may develop and provide training to their respective staff and to the contractor, subcontractors, and interested members of the public.

Per RFCA, CDPHE is the lead regulatory agency (LRA) for decommissioning activities conducted in the Site's Industrial Area.[21] To expedite the decommissioning process, the parties have agreed the LRA may exercise authority by participating in the IWCP process. For the purposes of this DOP, this means the LRA has an opportunity to discuss issues and ask questions, but it does not mean the LRA has approval authority for IWCP work packages. DOE and its contractor will advise the LRA of IWCP meetings and roundtable review sessions, and will provide relevant information in a timely manner. The LRA, DOE, and the contractor or subcontractors may use these roundtable review sessions as a forum for RFCA consultation. If this process does not address the LRA's concerns, the LRA may issue a "stop work" order pursuant to RFCA.[22]

[20] The consultative process is described in ¶¶51-61 of RFCA, in Appendix 2 of RFCA, and in Section 1.1.1 of the DPP.

[21] See RFCA ¶70.

[22] See RFCA (¶¶176-180).

# 3.0 BUILDING 707 CLOSURE PROJECT DESCRIPTION

The Building 707 Closure Project is comprised of Building 707 (including the 707A Annex) and various support facilities located within the Site's Industrial Area . Figure 3 shows the relative location of the Building 707 and associated facilities within the Industrial Area, a descriptive overview is provided below, and additional details are contained in the RLCR.

**Building 707 (Type 3)** is a two-story structure with a single-story addition located on the east side of the main building. The general layout of the building is depicted in Figure 4 and Figure 5. To the north is a free-standing two-story structure (i.e., the 707A Annex), which has a separate east wall, but is considered to be part of the main structure. The foundations for the building are cast-in-place concrete caissons and grade beams. The caissons are cast in holes drilled into bedrock and are connected by reinforced concrete tie beams. Structural framing is a pre-cast, pre-stressed concrete twin-tee roof and second floor, supported on pre-cast concrete beams, girders, and columns.

The first floor consists of a concrete slab on grade. To prevent the potential for the spread of fire and/or contamination from one room to another, the first floor is configured into a series of modules (Modules A through H, J, and K), separated by hallways. A network of chainveyors runs between the modules to provide for the transfer of materials between production areas within Building 707, and between Building 707 and Building 776/777.

The second floor is an open room containing ventilation fans, filter plenums, pumps, and tanks that support first-floor operations. The below-grade exterior surfaces of the columns, pre-cast panels, concrete walls, concrete block walls, and the top six inches of the exterior surfaces of the perimeter grade beams and footings are covered with coal-tar waterproofing pitch. A polyethylene vapor barrier is located under the floor slabs. Joints in the exterior pre-cast concrete panels are caulked with silicone sealant.

The basement is cast-in-place concrete, containing a variety of tanks (referred to as the "C-Pit tanks") that were used to collect and clean spent solvent and machine oil. Other below-ground features include a series of autoclaves used for the assembly of parts in a heated, high-pressure, helium atmosphere, and one elevator shaft.

The Site's supply of 138,000-volt electricity is stepped down for building use at seven transformers. Stepped-down voltages are distributed to motor control centers and emergency motor control centers on the second floor of the building. Four transformers supply 480 volts to equipment motor control centers, one supplies 480 volts to the emergency motor control centers and the uninterruptible power supply system, one supplies 2,400 volts to equipment on the second floor, and one supplies 480 volts to the lighting panel distribution system.

Plant air, instrument air, and breathing air are supplied to distribution points from air compressors located in Building 708. Nitrogen used to inert the production lines is piped to the building from the Nitrogen Plant (Building 223). In the event the Nitrogen Plant shuts down, a liquid nitrogen tank (T-223) located at the southeast corner of the building may be used to supply nitrogen to the building in an emergency. Argon is supplied from a liquid supply tank located at the southwest corner of Building 707. During production, carbon tetrachloride was supplied from an AST (T-206/D2) located on the north side of the building. Steam originating from the Steam Plant (Building 443) at 115 pounds per square inch (psi) is reduced to 30 psi at a pressure-reducing station located on the second floor. Tower water used to extract heat from the closed-loop cooling heat exchangers is supplied from Building 711. Ethylene glycol water (brine) coolant used to extract heat from the process chilled-water system is supplied by Building 708. Helium is supplied from a bank of tanks (T-209 to T221) located to the south of the building.

Figure 3. Building 707 Closure Project Facilities

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Persons with access to Unclassified Controlled Nuclear Information (UCNI) may obtain this information from the Building 707 Closure Project Manager.

# Figure 4. Building 707 First Floor Layout

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Persons with access to Uncontrolled Classified Nuclear Information (UCNI) may obtain this information from the Building 707 Closure Project Manager.

# Figure 5. Building 707 Second Floor Layout

The heating, ventilation, and air conditioning (HVAC) systems provides the desired temperature, humidity, and air exchanges within the building and maintains confinement of radioactive material by means of pressure differential controls (i.e., air flows from areas of least contamination to areas of higher contamination) and exhaust air filtration. There are nine supply systems in the Building 707 production areas and a separate system for the offices and corridors in the north part of the single-story section of the building. Most of the air is re-circulated, with only about 20 percent fresh air introduced from the outside. Air entering the handling unit is drawn through medium-efficiency filters and is heated or cooled as it passes over chilled-water or hot-water coils.

The general dry air system provides continuous re-circulation of clean, conditioned, low-humidity air to most of the plutonium handling areas of the building. The general air dryer system consists of nine similar conditioning units complementing the modular arrangement of the building. Although the conditioning units are independent, they are grouped to share common supply and exhaust plenums. Each conditioning unit blends outside air and re-circulated air drawn from the second floor equipment room. Corridor air is exhausted through module exhaust drops to ensure the corridors have a positive pressure flow to the modules.

The glovebox dry air system supplies dry air to all gloveboxes and conveyor lines not requiring an inert atmosphere. This is a single-pass system that draws air from the second-floor equipment room, filters it through HEPA filters, and dehumidifies and re-heats it using steam and hot water coils before distributing it to the gloveboxes. The exhaust from the gloveboxes then passes through four stages of HEPA filtration before being exhausted to the atmosphere.

Two inert atmosphere systems service gloveboxes and chainveyors in Modules A, B, C, J, K and the storage vault (i.e., X-Y Retriever) in Module K. These systems maintain a dry, inert atmosphere of nitrogen containing between 1 and 5 percent oxygen by volume. The nitrogen for both systems is supplied to the building at 125 psi, reduced to 15 psi for general building use, and further reduced to 3 psi for individual systems. Each system exhausts some of the inert gas to the atmosphere. The inert systems consist of a chilling coil, re-heat coil, re-circulating fan, four-stage HEPA filter plenum, and exhaust fan. All ventilation systems, with the exception of the office system, have backup systems that may be operated during maintenance activities or in the event of an emergency.

**Building 708 (Type 2)** is a windowless, single-story, concrete structure with a concrete slab floor on grade and a neoprene Hypalon® roof. The building consists of a single open room, which houses the Building 707 emergency generator and the supplied breathing air system for the 700 Complex (i.e., Buildings 707, 771, 776/777). The Building 708 control room is located on the west side of the building and is constructed of steel studs and gypsum board. The building also houses the chillers that supply ethylene glycol water solution (brine) to the closed loop cooling systems in Building 707.

**Building 709 (Type 2)** is a cooling tower, which was constructed in 1969 to service Building 707 cooling water requirements. It has been out of service since 1988 or 1989. The cooling tower is a square wooden structure that sits within a concrete basin. The 35-foot tower has two cells, each with separate fan motors and gearboxes. The gearboxes are located directly beneath the fan blades and are below the top deck. The fans are located on the top deck and are surrounded by shrouds. The lower exterior portion, on the north and south sides, consist of 3 sheet-metal slats approximately three feet wide. Approximately 17 lamps surround the perimeter of the top of the tower and the access stairs to the top deck. The top deck of the cooling tower also houses the return water distribution manifolds and two security post positions. The west side of the structure contains a metal ladder to the platform. The pumps and a generator are located on a steel platform west of structure. In addition, electrical systems, a hoist system, and sheet-metal shed are located on west side of the tower.

**Building 718 (Type 2)** Building 718 is an auxiliary shed, containing the plenum deluge system for Building 711.

**Building 731 (Type 2)** is a plenum deluge/process waste pit constructed of reinforced concrete, with a reinforced concrete stairway leading to the below-ground portion of the structure. The pit contains two 1,650-gallon fiberglass collection tanks and associated ancillary equipment. Waste collected in the tanks (e.g., chiller condensate, emergency eye wash/shower wastewater, decontamination water, and plenum deluge water) is transferred to Building 374 for treatment.

**Building 732 (Type 2)** is the former laundry pumping vault. The concrete structure contains one 800-gallon storage tank and ancillary equipment, which were used to filter wash water from the Building 778 laundry prior to transfer to Building 374 for treatment. Upon closure of the laundry facility in the early to mid 1990s, the tank system was tied into the Building 776/777 plenum deluge system.

**Building 778 (Type 2)** is a metal, Butler®-type building, located between Building 707 and Building 776/777. This building provides all-weather access to Buildings 707 and 776/777 through two enclosed corridors. In addition, it contains a portion of the chainveyor that was used to transport material between production areas in Buildings 707 and 776/777. The building houses the maintenance shops and the locker/shower facilities for those buildings. A laundry facility was added to the building when plutonium laundry operations were consolidated on Site. The walls are insulated with fiberglass batting and covered with gypsum board. The office ceilings are drop-in acoustical tile and the locker/shower room ceilings are gypsum board. Ceilings in the shops and the laundry are open to the insulation in the roof of the building. Initially, the east half of the building was the men's locker room and offices, while the west half contained the maintenance shops and the laundry. In the late 1970s or early 1980s, the locker/shower rooms were expanded to allow for the construction of a women's locker/shower room at the northwest corner of the men's locker room. In the late 1980s, an addition was added to the north side, adjacent to the laundry, to house a filter plenum for the air exhausting from the dryers.

**Trailer 707S (Type 1)** was used to store machining oil, cutting fluid, lubrication oils, greases, and used oils, which were blended for other uses. Presently the shed is used for equipment storage. The building is constructed of metal panels, a metal roof, and wooden floor.

**Buildings 711 and 711A (Type 1)** supply tower water to the cooling systems in Buildings 707, 708, and 750. Building 711 is the cooling tower and Building 711A houses an emergency diesel pump for the cooling tower.

**Underground Storage Tank System (Type 1)** Tank T-290 is a diesel fuel tank system, which was emptied, foamed, and closed in place in 1996.

**Aboveground Storage Tank Systems (Type 2 and Type 1)** supporting Building 707 operations are located outside the facility. These tanks include: carbon tetrachloride Tank T206/D2; liquid argon Tank 208; helium Tanks T209-T221; liquid nitrogen Tank T-223; and diesel fuel Tanks T-324, T-325, TK-11 and TK-16.

# 3.1 Building History

Facilities within the Building 707 Closure Project were designed and constructed in the early 1970s to replace the manufacturing processes originally performed in Building 776/777. Operations were divided into eight categories: casting, forming, metallurgy, machining, assembly, inspection, non-destructive testing of plutonium parts, and associated support services. Plutonium metal feed was cast into ingots of the required shapes, which then proceeded through standard metalworking steps to become finished weapons parts. Finished plutonium parts and parts made of other materials, such as uranium, beryllium, and stainless steel, were assembled into subassemblies, which were joined to become final assemblies. Parts were inspected and tested at various points throughout the production process.

Prior to the change in mission, the production process began in Modules A, J, and K, where feed material was stored in preparation for casting into various shapes. Module B housed metallurgical operations, which were performed to roll, heat treat, and shape plutonium parts, which were then sent to machining operations. After shaping, excess metal was cut off and sent to Module C to be briquetted.

Module C was used to machine plutonium parts to the required dimensions. Turnings and chips from machining operations in Module C and trimmings from forming operations in Module B were degreased and sent to the briquetting press to be made into pucks, which were returned to the casting furnaces to be re-cast into feed ingots. In Module D, serial numbers were affixed to finished parts, which were cleaned with solvents, weighed, and inspected.

Plutonium pits were assembled in Module E, beginning with the welding of matched hemi-shells with electron beam welders. The pits were then inspected using any of a number of inspection disciplines, including radiography x-ray, weld scanners, eddy current testing for weld penetration, and fluorescent dye penetration for cracks and voids. The subassemblies were then washed and sent to Module F for final assembly.

Module F, known as the "super dry room" because of the precisely controlled humidity, temperature, and airflow, was the final assembly point where the plutonium, uranium, and covering parts were put together. The covering parts, such as beryllium and stainless steel, were welded shut. The completed assembly was then "pumped down" on a heated table to check for leaks and to remove moisture and other contaminants. Module F also contains a mass spectrometry laboratory that was used to analyze gases in the assembled pits.

During production, several operations were carried out in Module G, including brazing of plutonium parts encased in other non-radioactive metals; brazing of non-radioactive subassemblies; cleaning of aluminum, stainless steel, uranium, and beryllium parts; inspection of these subassemblies; and, if needed, disassembly of rejected units. Module H was a high-pressure assembly area for plutonium, vanadium, beryllium, titanium, and uranium parts. High-pressure assembly was accomplished in an autoclave under a heated, high-pressure helium atmosphere. Beryllium parts were baked in vacuum furnaces to remove moisture.

## 3.2 Current Status

With suspension of nuclear production operations at Rocky Flats in 1989, and the subsequent discontinuation of the production mission in 1991, activities conducted in Building 707 and associated facilities have been re-directed to support Site closure, including:

- Completion of mission risk reduction activities, such as residue stabilization and oxide stabilization; and
- Completion of deactivation activities in preparation for decommissioning, including removal of SNM and classified matter; shipment of metal components, declassification of classified molds and/or tools by shape alteration; and removal of loose equipment, combustibles, chemicals, and organic liquids.

In addition, landlord activities are performed, as necessary, to support day-to-day operations and to ensure compliance with the Building 707 Basis for Interim Operation (BIO)[23] and other Site requirements, including general housekeeping, routine waste management, maintenance of safety category systems, laboratory services, records management, inspections, and surveillances. The Building 707 BIO provides detailed descriptions of facility activities.

[23] Building 707 Facility Complex Basis for Interim Operation (BIO), latest revision. The BIO is the facility's authorization basis (AB).

## 3.3 Expected Condition of Type 3 and Type 2 Buildings at the Beginning of Decommissioning

The Type 3 and Type 2 buildings within the Building Closure Project will be decommissioned using a graded approach. As mission activities are completed in each area, deactivation activities will be undertaken to prepare for decommissioning in accordance with this DOP. The schedule of decommissioning activities is included as Appendix A to this DOP.

Throughout the course of the Building 707 Closure Project, the Site's Integrated Safety Management System (ISMS) will be implemented to provide configuration control and minimize the potential for uncontaminated facilities to become contaminated, or decontaminated facilities to be re-contaminated. ISMS and the associated RFETS implementing programs are described in Section 4.1 of this DOP.

# 4.0 PROJECT APPROACH

The decommissioning planning process for the Building 707 Closure Project has been completed and the costs and schedules are included in the RFETS Closure Project Baseline (CPB). During the course of the Building 707 Closure Project, there may be instances where circumstances differ from those predicted. In such cases, planned activities may be revised without revising the CPB. Significant changes will be shared with the LRA as part of the RFCA consultative process and, when required, appropriate modifications will be made to this DOP in accordance with RFCA.

## 4.1 Work Planning and Execution

Decommissioning activities will be planned and executed in accordance with the RFETS Integrated Safety Management System (ISMS), which provides the framework for mitigating adverse impacts to workers, the public, and the environment. The ISMS is structured around five core principles:

- Define the work scope,
- Identify and analyze the hazards,
- Identify and implement controls,
- Perform the work, and
- Provide feedback.

As described in the following paragraphs, ISMS is implemented through a variety of existing Site-wide programs. The corresponding implementing documents are listed in Table 2.

### 4.1.1 Integrated Work Control Program

The contractor-approved IWCP Manual[24] defines the method by which ISMS is implemented at the activity level. When work is identified, the responsible manager first determines whether an emergency response is required. Emergency work (e.g., fire suppression, cleanup of hazardous material spills) may be performed without prior planning, but must be documented on an Emergency Action Work Log (EAWL). If the activity does not involve emergency work, a Work Process Form (WPF) is completed and the responsible manager initiates the IWCP process to plan and perform the necessary work.

Based on the information contained on the WPF, the responsible manager determines whether the work can be performed by skill-of-the-craft (i.e., whether it is routine work, such as painting or re-lamping, which has already been evaluated for associated hazards). If the work cannot be performed by skill-of-the-craft, a Hazard and Discipline Identification Tool (HDIT) is completed to identify the general hazards involved in the work and to determine the disciplines needed to plan the work in detail.

Following establishment of the planning team, the responsible manager selects the appropriate planning approach, consistent with the uncertainty, complexity, and hazards associated with the work. As described in the IWCP Manual, two planning options are available:

- The high planning approach is applied when there are significant hazards and/or environmental impacts or there is significant uncertainty about the hazards, and either there is significant complexity associated with the work or the project team has never performed the work before.

[24] RFETS Integrated Work Control Program (IWCP) Manual (MAN-071-IWCP), (latest revision).

- The standard planning approach is applied if the high planning approach is not needed.

In either case, a Job Hazards Analysis (JHA) is then developed by the planning team to identify specific work hazards and to establish appropriate hazard controls. As depicted in Figure 6, this is an iterative process that is repeated until all controls are identified, then revisited when new hazards are discovered or the scope of work changes.

Upon completion of the JHA, Work Control Document (WCDs), such as activity-specific procedures and IWCP work packages, are prepared and submitted (if required) for nuclear safety screening and independent safety review. Following those reviews, the necessary concurrence and approvals are obtained by the appropriate Site SMEs (e.g., radiological engineering, environmental management, OS&IH), and the work is performed. As discussed in Section 2.3 of this DOP, the LRA has a standing invitation to IWCP planning meetings and associated roundtable review sessions.

### 4.1.2 Readiness Determination Program

Readiness determination SMEs will review individual projects and activities to establish the need for an Operational Readiness Review (ORR) or Readiness Assessment (RA) in accordance with the Site Readiness Determination Manual (RDM). The RDM applies to the startup and restart of nuclear, non-nuclear, radiological, ER, waste management, deactivation, and/or decommissioning activities that are new, complex, or require activity-specific changes to a facility's authorization basis (AB). For the Building 707 Closure Project, it is anticipated readiness determinations will be performed for initial component removal activities; size reduction of gloveboxes, tanks, chainveyors and similar equipment; and building demolition, although some of these reviews may be combined, depending on the schedule of activities. As discussed in Section 2.3 of this DOP, the LRA has a standing invitation to all readiness reviews performed for work conducted within the scope of this DOP.

### 4.1.3 Conduct of Operations Program

The Conduct of Operations (COOP) Program provides a formal, disciplined approach to facility operations. Key elements of the Program include the following:

- Work must be performed by appropriately trained personnel using adequate and controlled procedures,
- Work must be properly supervised, and
- Work must be authorized by the Configuration Control Authority (CCA).

The COOP Program also provides processes for monitoring facility operations through functions such as logkeeping, conduct of rounds, internal surveillances, and requirements for planning and releasing work. Facility managers use the Plan of the week (POW) and plan of the day (POD) to schedule, authorize, and control activities in an RFETS facility, and provide a forum for discussing planned activities and resolving scheduling conflicts. Once the POW and POD have been established and approved by facility management, a meeting is held early in the shift to release work for the day. The Shift Manager or CCA chairs this meeting, during which he or she explains terminations in the facility, identifies radiological areas, and ensures work will be performed by qualified personnel (i.e., personnel appearing on the list of qualified individuals (LOQI) for the facility). Pre-evolution briefings (PEBs) are conducted to ensure that project personnel understand the applicable hazards and controls, and are adequately prepared to perform the scheduled activities. The PEB provides a mechanism for implementing the ISMS at the floor level. As discussed in Section 2.3 of this DOP, the LRA has a standing invitation to POWs, PODs, and PEBs.

# Table 2. RFETS Integrated Safety Management System Programs and Associated Implementing Documents

| ISMS Program | Implementing Document(s) | Document #(s) |
|---|---|---|
| Integrated Work Control Program | Site Integrated Work Control Program Manual | MAN-071-IWCP |
| Readiness Determination Program | Site Readiness Determination Manual | MAN-040-RDM |
| Conduct of Operations Program | Site Conduct of Operations Manual | MAN-066-COOP |
| Nuclear Safety Program | Nuclear Safety Program Unreviewed Safety Question Process | PRO-664-NSP-USQP |
| | Evaluation of Unreviewed Safety Questions | 3-J69-NSPM-5C-01 |
| Criticality Safety Program | Site Nuclear Criticality Safety Manual | MAN-088-NSM |
| Radiation Protection Program | Site Radiological Control Manual | MAN-102-SRCM |
| | Site Radiological Safety Practices Manual | RSP-01 to RSP-18 |
| Occupational Safety & Industrial Hygiene Program | Occupational Safety & Industrial Hygiene Program Manual, including Chapter 28, Chronic Beryllium Disease Prevention Program (CBDPP) | MAN-072-OS&IHPM |
| Transportation Program | Site Transportation Manual (latest revision) | RF-TSM |
| | Off-Site Transportation Manual (latest revision) | 1-T-95-TRAFFIC-120 |
| Emergency Preparedness Program | Site Emergency Plan | EPLAN-96 |
| Environmental Management Program | Environmental Management Program Manual (latest revision) | MAN-080-EMPM-EMPP |
| Quality Assurance Program | | |
| 1. Quality Assurance Programs | Site Quality Assurance Manual | NA |
| 2. Personnel Training and Qualification | Training Program Manual | MAN-094-TPM |
| 3. Quality Improvement | Site Corrective Action Requirements Manual | 1-MAN-012-SCARM |
| 4. Documents and Records | Site Documents Requirements Manual | 1-MAN-001-SDRM |
| 5. Work Processes | Integrated Work Control Program, Readiness Determination Manual, Conduct of Operations Manual, Nuclear Safety Manual, Nuclear Criticality Safety Manual, Radiological Control Manual, Site Occupational Safety & Industrial Health Program Manual | MAN-071-IWCP, MAN-040-RDM, MAN-066-COOP, PRO-664-NSP-USQP, MAN-088-NSM, MAN-102-SRCM MAN-072-OS&IHPM |
| 6. Design | Site Engineering Requirements Manual | MAN-027-SERM |
| 7. Procurement | Acquisition Procedure for Requisitioning Commodities | 1-W36-APR-111 |
| | Services Identification and Control of Items | 1-A67-QAP-08.01 |
| 8. Inspection and Acceptance Testing | Inspection and Acceptance Test Process | 1-PRO-072-001 |
| 9. Management Assessments | Site Integrated Oversight Manual | 1-MAN-013-SIOM |
| 10. Independent Assessments | Site Integrated Oversight Manual | 1-MAN-013-SIOM |

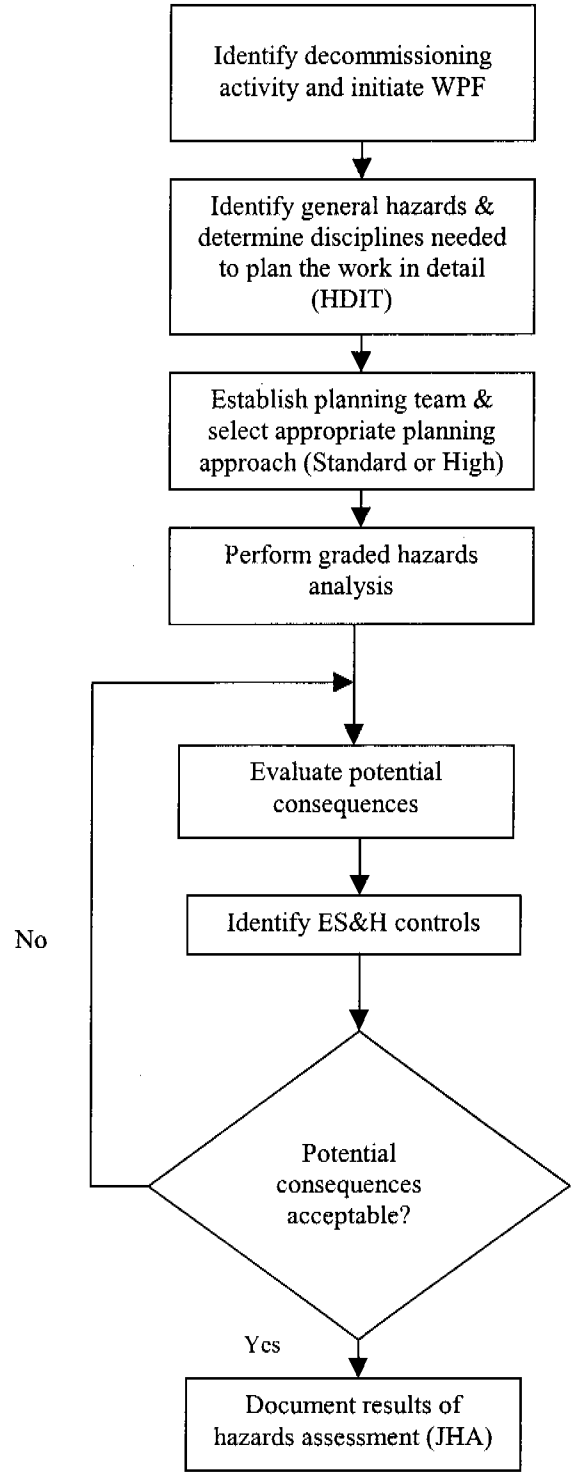


Figure 6. Integrated Work Control Program Hazards Identification & Assessment Process

### 4.1.4 Nuclear Safety Program

Nuclear safety SMEs will review procedures and work packages to ensure planned activities may be performed within the facility's existing AB, and the established radiological controls are adequate to protect the worker, the public, and the environment. The safety evaluation screen (SES) identifies activities that may be outside the AB and therefore may present an Unreviewed Safety Question (USQ). A USQ Determination (USQD) is performed to evaluate activities with the potential to challenge the limits of a facility's AB. It is a more in-depth review of the activity than the SES. Activities determined to be USQs are evaluated to determine whether additional building safety controls are required to manage the hazards associated with the activity. If additional controls are required, they are documented as a "page change" to the building's AB or in a Justification for Continued Operation (JCO).

### 4.1.5 Criticality Safety Program

The Criticality Safety Program establishes controls for activities involving fissionable material. Elements of this Program include developing engineered and/or administrative criticality safety controls, monitoring compliance status with established controls that include occurrence investigation and reporting, and maintaining and controlling distribution of technical documents. The Program requires the Criticality Safety Program organization to approve criticality safety controls either through new evaluations or through the Criticality Safety Limit Examination Program for all activities involving the storage, relocation, and/or processing of fissionable material. The Criticality Safety Program is implemented in accordance with the DOE-approved Site Nuclear Criticality Safety Manual.

### 4.1.6 Radiation Protection Program

The Radiation Protection Program implements standards, limits, and requirements for protecting workers from exposure to radioactive materials. The Program is based on the principle of ALARA (i.e., as low as reasonably achievable) and provides for personnel dosimetry, surveillance and maintenance of engineered radiation protection systems, issuance of radiological work permits (RWPs), and area surveillance and posting. Radiological protection for planned activities is ensured through reviews of work control documents, pre-job surveys, and the use of personal protective equipment (PPE). Personnel exposures are formally tracked, recorded, and reported to each individual. Radiological monitoring is performed in accordance with the DOE-approved Radiological Control Manual and Radiological Safety Practices Manual.

### 4.1.7 Occupational Safety & Industrial Hygiene Program

The Occupational Safety & Industrial Hygiene (OS&IH) Program ensures that personnel exposures to physical, chemical, and biological hazards in the work environment are controlled by requiring job supervisors and OS&IH personnel to identify OS&IH hazards in the work area. Program safety and technical reviews are integrated into the IWCP process to ensure non-radiological OS&IH hazards (i.e., physical, chemical, biological) are identified and appropriate measures are instituted to protect the worker (e.g., engineered systems, PPE, monitoring equipment). The OS&IH Program incorporates the standards defined in 29 CFR Parts 1910 and 1926, DOE regulation 10 CFR 850 (i.e., the Chronic Beryllium Disease Prevention Program [CBDPP]), and the DOE-approved Site Occupational Safety & Industrial Hygiene Program Manual.

### 4.1.8 Environmental Management Program

Closure activities will be monitored by several RFETS environmental management organizations. The Environmental Management and Compliance Group uses the RFETS Environmental Checklist to identify activities that may impact any of the Site's media-specific environmental management programs. The Environmental Media Management Group implements the Site IMP, which specifies monitoring requirements for facility decommissioning and other source removal actions to protect air, water, and ecology.[25] Issues relating to the Site's National Pollutant Discharge and Elimination System (NPDES) permit and incidental waters are administered through the Water Operations Group within the Remediation, Industrial Area D&D, and Site Services (RISS) Project.

In general, environmental monitoring for individual closure projects will be implemented during the decommissioning phase of each project and may involve the installation of groundwater, air, and surface water monitoring stations around the facility. Where localized activities for a project generate contamination with the potential to impact air or water, personnel from the Surface Water Operations Group and ER Program will characterize the contamination. Following are examples of the Site's media-specific environmental management programs and responsible organizations:

- RFCA Coordination Program (Environmental Systems & Stewardship Group),
- RCRA Program (Environmental Management and Compliance Group),
- Air Quality Management Program (Environmental Media Management Group),
- Site Water Management Program (Environmental Media Management Group),
- Chemical Life Cycle Management Program (RISS Environmental Safety Group),
- NPDES Program (RISS Water Operations Group),
- Incidental Waters/Internal Waste Streams (RISS Water Operations Group),
- Safe Drinking Water Act Program (RISS Environmental Safety Group),
- Sanitary Waste Disposal Program (Materials Stewardship Project),
- Underground/Aboveground Storage Tank Program (RISS Water Operations Group), and the
- National Environmental Policy Act (NEPA) Program (NEPA Support Group).

### 4.1.9 Transportation Program

The Site Transportation Program specifies safe and compliant packaging requirements for both on-Site and off-Site transportation of radioactive and hazardous materials to prevent releases and minimize accident consequences. The Transportation Program describes a process for incorporating packaging and labeling requirements into work control documents and defines training requirements for personnel involved in the packaging and shipment of hazardous materials. The Transportation Program is implemented through the DOE-approved Site Transportation Manual and the Off-Site Transportation Manual.

### 4.1.10 Emergency Preparedness Program

The Emergency Preparedness Program provides the plans, procedures, and resources necessary to respond to Site emergencies. The Program is based on a comprehensive understanding of the potential hazards and potential radioactive material and hazardous chemical release mechanisms present in the facility. Elements of the Program include management planning; training; and drills (Site-wide and building-specific) for possible abnormal events including fires, hazardous material spills, inadvertent criticalities,

[25] Site Integrated Monitoring Plan (latest revision).

and personnel accountability during facility evacuation. The Program's trained emergency response personnel ensure worker and public safety during an abnormal event. Elements of the Emergency Preparedness Program also include timely notifications of the emergency preparedness organization. The Emergency Preparedness Program is implemented through the DOE-approved Site Emergency Plan, as augmented by building-specific emergency response operations procedures.

### 4.1.11 Quality Assurance Program

All work performed within the scope of this DOP will be accomplished in accordance with the requirements of 10 CFR 830.120, Quality Assurance Requirements (the QA rule), the American National Standards Institute/American Society for Quality Control (ANSI/ASQC-E4), and the relevant DOE Order for Quality Assurance. The substantive requirements of the federal regulation, DOE Order, and ANSI/ASQC-E4 are implemented through the DOE-approved Site Quality Assurance Manual (SQAM). Table 2 summarizes the 10 quality criteria and lists the applicable implementing documents. Future changes to this list of documents will be shared with the LRA as part of the RFCA consultative process.[26]

## 4.2 Facility Characterization

Facilities within the Building 707 Closure Project are being characterized using a three-step approach: (1) scoping characterization, (2) reconnaissance level characterization (RLC), and (3) in-process characterization. The following paragraphs describe each step in more detail.

### 4.2.1 Scoping Characterization

During scoping characterization, existing records and documents were collected, and present and former Building 707 employees were interviewed to determine the radiological, chemical, and physical conditions of the facilities. Based on the information collected, the B707 Closure Project team proceeded to conduct the RLC in accordance with the requirements of the RFETS Reconnaissance Level Characterization Plan (RLCP).

### 4.2.2 Reconnaissance Level Characterization

The purpose of RLC is to provide an initial assessment of the contamination, hazards, and other conditions associated with a facility. The RLC for the Building 707 Closure Project was performed from December 1999 through May 2000. Results are documented in the Reconnaissance Level Characterization Report (RLCR) for the Building 707 Cluster and summarized in Table 3. Hazards were assessed based on a review of historical records, process knowledge, and survey measurements and analytical data collected from physical samples of various media (e.g., paint, cement) during the course of the RLC.

Radiological contamination was found within Buildings 707, 708, 709, 718, 731, 732, and 778. Contamination is present on building surfaces (e.g., floors, walls, ceiling, roof) and in equipment and building systems (e.g., gloveboxes and ventilation ducts). Some equipment and systems and areas within Building 707 have levels of radiological contamination exceeding 2,000 dpm/cm$^2$ removable; and 50,000 dpm/100 cm$^2$ fixed plus removable.

[26] As part of the ongoing Technical Infrastructure Alignment Initiative, the contractor is reviewing, revising, combining, and/or re-writing 15 of the Site's high-level planning documents, including quality documents. As a result, document names and numbers are subject to change.

# Table 3. Summary of Results from the Building 707 Reconnaissance Level Characterization Report

| Building/ Facility | Chemical Contamination Indicated? | Type of Chemical Contamination | Location | Radiological Contamination Indicated?[c] | Type of Radiological Contamination | Location | Building Classification[a] |
|---|---|---|---|---|---|---|---|
| B707 | Yes | Asbestos[d]<br>Metals<br>Beryllium<br>Organic solvents | Multiple; including tiles & insulation<br>Inside the Kathabar® dehumidification systems<br>Modules F & G; also in gloveboxes, other equipment, piping, and plenums<br>Residues in building systems (e.g., tanks and ancillary equipment) | Yes | Fixed alpha with some removable | Extensive; on interior building surfaces, on and in equipment and systems, and on roof/exterior walls | Type 3 |
| B708 | Yes | Asbestos[d] | Ceiling tile, floor tile, and insulation | Yes[b] | Fixed alpha | Roof | Type 2 |
| B709 | Yes | Asbestos[d] | Thermal systems insulation piping adjacent to B799 | Yes | U233/234, U235, U238 | Sediment in sump | Type 2 |
| B718 | Yes | Asbestos[d] | Piping insulation | Yes | Fixed alpha | Roof | Type 2 |
| B731 | None found | None found | None found | Yes | Fixed alpha and removable | Interior and roof surfaces; on/in equipment & systems | Type 2 |
| B732 | Unknown; not inspected; airborne radioactivity area | Unknown | Unknown | Yes | Fixed alpha and removable | Interior and roof surfaces; on/in equipment & systems | Type 2 |
| B778 | Yes | Asbestos[d] | Multiple; including tiles & insulation | Yes | Fixed alpha | Minimal; on floors, equipment, and roof | Type 2 |
| Aboveground Tank T-206/D-2 | Yes | Carbon tetrachloride | Inside tank | None found | None found | None found | Type 2 |
| Trailer T707S | Yes | Asbestos[d] | Building materials | None found | None found | None found | Type 1 |

# Table 3. Summary of Results from the Building 707 Reconnaissance Level Characterization Report

| Building/ Facility | Chemical Contamination Indicated? | Type of Chemical Contamination | Location | Radiological Contamination Indicated?[c] | Type of Radiological Contamination | Location | Building Classification[a] |
|---|---|---|---|---|---|---|---|
| B711 & B711A | Yes | Asbestos[d] | Piping insulation | None found | None found | None found | Type 1 |
| Aboveground Tanks T-208, T-209 to T-221, T-223, T-324, T325, TK-16, & T-284 | None found | None found | None found | None found | None found | None found | Type 1 |
| Underground Tank T-290 | None found | None found | None found | None found | None found | None found | Type 1 |

a Per the DPP, Type 3 facilities have significant contamination and/or hazards; Type 2 facilities do not have significant contamination or hazards, but are in need of decontamination; and Type 1 facilities are free of contamination. Building classification does not include environmental media or bulk media beneath the immediate surface of the floors.

b Contamination type to be confirmed; activity may be from naturally occurring radioactive material (i.e., not DOE-added material).

c Radiological Engineering recommends surveys where significant configuration changes are implemented in the building prior to demolition due to unknowns associated w/ movement of bulk material or equipment.

d The presence of asbestos does not make a facility a Type 2 as long as the asbestos is removed pursuant to the Site's asbestos abatement procedures.

Beryllium contamination is present in Modules F and G of Building 707, and in many of the Building 707 gloveboxes, plenums, piping, and other equipment (e.g., the autoclaves and bake-out ovens in Module H, and gloveboxes and other equipment containing liquids in Modules A, B, C, E, H, J and K). ACM is present in most of the buildings within the Building 707 Closure Project in the form of floor and ceiling tile, other building material, and insulation. The Kathabar® dehumidification systems located on the second floor of Building 707 are contaminated with heavy metals, including lead and chromium.

Potential physical hazards within the Building 707 Closure Project consist of those common to standard industrial environments, including hazards related to energized systems, utilities, gas cylinders, trips and falls, and forklift operations. The buildings have been relatively well maintained and are in good physical condition. As a result, there are no unique physical hazards associated with any of the buildings within the Building 707 Closure Project.

### 4.2.3 In-Process Characterization

Additional characterization will be conducted during decommissioning, as facility components are removed and building surfaces are further exposed. This type of characterization is referred to as in-process characterization. Data from in-process characterization is used to identify additional hazards; refine approaches to component removal, size reduction, and decontamination; revise waste volume estimates; and modify ES&H controls, as necessary. In-process characterization is also conducted to verify that decontamination activities have achieved the applicable performance specifications, such as release or reuse criteria and disposal facility WAC. In addition, pre-demolition surveys will be conducted prior to demolition to ensure the facilities have been decontaminated to meet applicable decontamination criteria. Detailed information regarding the characterization process and associated requirements is contained in the RFETS Decontamination and Decommissioning Characterization Protocol (DDCP).[27]

## 4.3 Set Identification and Prioritization

For planning purposes, the Building 707 Closure Project has been divided into 17 Sets, which are small, manageable groupings of similar systems, equipment, and areas or rooms that can be worked independently. Sets serve as the foundation for scheduling decommissioning work. Typically, Sets are scheduled for decommissioning based on a series of factors, including safety, physical constraints, resource requirements, operational issues, management issues, waste generation issues, and cost. The current decommissioning schedule is discussed in Section 9.0 and presented in Appendix A. As shown on the schedule, decommissioning activities may be ongoing in two or more Sets at the same time. Detailed Set descriptions are provided in the RLCR. Summary descriptions are presented below. Removal, size reduction, and decontamination techniques and associated controls are discussed in Section 4.4. Step-by-step work instructions will be provided in the individual IWCP work packages for each Set.

Set 1 consists of Module A, including two central chainveyors (Chainveyors S3-A and S3-B), four tilt-pour furnace gloveboxes, a number of support gloveboxes, several gloveboxes with stationary furnaces and other equipment used for residue processing, overhead storage and transfer chainveyors, and the 707/776 transfer chainveyor, which runs from Module A, across the main corridor of Building 778, into Building 776/777. Work performed within the scope of this Set will include chemical and radiological cleanup activities, as well as the removal of ACM, large pieces of glovebox equipment, gloveboxes, the chainveyors, several large electrical panels and buss bars, a small quantity of hazardous piping, the Zone I and Zone II ventilation ductwork and associated service piping and conduit, and the suspended ceiling.

[27] Rocky Flats Environmental Technology Site Decontamination and Decommissioning Characterization Protocol (M AN-077-DDCP), latest revision.

Set 2 consists of Module B, including a central chainveyor (Chainveyor S4); the hydroform press; rolling, shearing, and de-brimming equipment; a lathe; a variety of heat-treating equipment and furnaces; overhead storage and transfer chainveyors; and a large continuous casting glovebox that was never put in service. Work performed within the scope of this Set will include chemical and radiological cleanup, as well as the removal of large pieces of equipment inside the gloveboxes, the gloveboxes, the chainveyors, several large electrical panels and buss bars, a significant quantity of hazardous piping, the Zone I and Zone II ventilation ductwork and associated service piping and conduit, and the suspended ceiling. Gloveboxes built around the forging equipment must be cut away as the equipment is dismantled.

Set 3 consists of Module C, including the basement beneath Module C (referred to as "C-Pit"); a central chainveyor (Chainveyor S5); several lathes, milling machines, and drill presses; and overhead storage and transfer chainveyors. C-Pit was used to collect and clean spent solvent and machine oil. It contains 16 pencil tanks, two annular tanks, one raschig ring tank, and associated piping. Work performed within the scope of this Set will include chemical and radiological cleanup activities, as well as the removal of large pieces of glovebox equipment, the gloveboxes, the chainveyor, the C-Pit tanks and ancillary equipment, several large electrical panels and buss bars, a significant quantity of hazardous piping and tanks, the Zone I and Zone II ventilation ductwork and associated service piping and conduit, and the suspended ceiling. Gloveboxes built around the machining equipment must be cut away as the equipment is dismantled.

Set 4 consists of Module D, including a central chainveyor (Chainveyor S6); a number of gloveboxes used for inspection of parts or, more recently, destruction of graphite molds; and overhead storage and transfer chainveyors. Work performed within the scope of this Set will include chemical and radiological cleanup activities, as well as removal of large pieces of glovebox equipment, the gloveboxes, the chainveyor, several large electrical panels and buss bars, a significant quantity of hazardous piping, the Zone I and Zone II ventilation ductwork and associated service piping conduit, and the suspended ceiling.

Set 5 consists of Module E, including a central chainveyor (Chainveyor S7); gloveboxes used for the final assembly, welding, cleaning, and inspection of parts and, more recently, for residue processing; and overhead storage and transfer chainveyors. Work performed within the scope of this Set will include chemical and radiological cleanup activities, as well as the removal of large pieces of glovebox equipment, the gloveboxes, the chainveyor, several large electrical panels and buss bars, a significant quantity of hazardous piping, the Zone I and Zone II ventilation ductwork and associated service piping and conduit, and the suspended ceiling.

Set 6 consists of Module F, including two downdraft tables and a small portion of Chainveyor S11. The remaining area is currently open and used for the storage and staging of residue drums. Work performed within the scope of this Set will include chemical and radiological cleanup activities, as well as removal of the downdraft tables and chainveyor, a small quantity of drywall, ACM, the Zone I and Zone II ventilation ductwork and associated service piping and conduit, and the suspended ceiling.

Set 7 consists of Module G, including two beryllium lathes, brazing and welding equipment, several hoods, degreasers, and some pressure-testing equipment. The module is divided into a number of rooms where additional non-nuclear support activities were performed. Work conducted within the scope of this Set will include chemical and radiological cleanup activities, as well as removal of the beryllium-contaminated equipment, buss bars, a small quantity of hazardous piping, ACM, the Zone I and Zone II ventilation ductwork and associated service piping and conduit, and the suspended ceiling and internal module walls.

Set 8 consists of Module H, including the areas surrounding eight autoclaves, furnaces, and associated equipment. Work performed within the scope of this Set will include chemical and radiological cleanup

activities, as well as removal of the equipment and buss bars, ACM, the Zone I and Zone II ventilation ductwork, and associated service piping and conduit. The autoclaves and the concrete rooms surrounding them will be decontaminated and removed during demolition.

Set 9 consists of Module J, Rooms 140 and 142, and the J Vault, including a central chainveyor (Chainveyor S16), several gloveboxes with plutonium metal and oxide furnaces, and storage and transfer chainveyors (i.e., J-K centerline to the X-Y Retriever). Work performed within the scope of this Set will include chemical and radiological cleanup activities, as well as removal of large pieces of glovebox equipment, the gloveboxes, several large electrical panels and buss bars, the Zone I and Zone II ventilation ductwork and associated service piping and conduit, and the suspended ceiling. Gloveboxes built around the casting equipment must be cut away as the equipment is dismantled.

Set 10 consists of Module K, Rooms 145 and 146, and the X-Y Retriever, including a central chainveyor (Chainveyor S16), several gloveboxes with plutonium metal furnaces, and storage and transfer chainveyors (i.e., J-K centerline to the X-Y Retriever). Work performed within the scope of this Set will include chemical and radiological cleanup activities, removal of large pieces of glovebox equipment, gloveboxes, buss bars, the Zone I and Zone II ventilation ductwork and associated service piping and conduit, as well as the suspended ceiling. A number of the gloveboxes were built around the casting equipment and may have to be cut away as the equipment is dismantled. The X-Y Retriever is a large (approximately 1,800 $ft^2$) Zone I room that will require extensive decontamination prior to size reduction.

Set 11 consists of the entire second floor of Building 707 (and 707A), including Rooms 200, 210, 220, and 240. Radiological contamination is present in the Zone I re-circulation and exhaust plenums (inert and air), Zone II exhaust plenums, room and corridor air supply, dry air system supply (including the Kathabar® dehumidification system), and the utilities controls. Work performed within the scope of this Set will include chemical and radiological cleanup activities, and removal of the mechanical, electrical, instrumentation and alarm systems associated with the air supply equipment. There is significant plutonium holdup in the Zone I ductwork upstream of the inert plenums, and significant remediation of ACM is required for the piping and dehumidification units.

Set 12 consists of the Contamination Area (CA) located in the southeast portion of Building 707 and the corridors connecting all the modules. This Set includes the rooms used for radiography and product QA, the dock and shipment preparation areas, the tool crib, and corridor ceilings. Work performed within the scope of this Set will include chemical and radiological cleanup activities, and removal of mechanical and electrical systems and associated instrumentation and alarm systems. Chainveyors connecting module gloveboxes are identified within the scope of specific modules, and not included in this Set.

Set 13 consists of the office and administrative areas located on the ground floor in the northeast corner of Building 707. Work performed within the scope of this Set will include removal of the mechanical, electrical, instrumentation, and alarm systems, including the ventilation equipment servicing the office areas. There is no significant radiological or chemical contamination associated with Set 13.

Set 14 consists of tank the systems located outside Building 707, including carbon tetrachloride, diesel fuel, argon, nitrogen, and helium tanks. There is no radiological contamination associated with Set 14. The tanks will be emptied during deactivation, and characterized and removed during decommissioning.

Set 15 consists of the Type 1 buildings located within the Building 707 Closure Project. Decommissioning activities will be performed pursuant to the DPP. This Set is not included within the scope of this DOP and is identified here only for clarity.

Set 16 covers the final survey and demolition of the Type 3 and Type 2 buildings, including removal of the slabs, basement walls, and floors to a depth at least three feet below grade (see Section 4.5). Activities conducted within the scope of this Set will be coordinated with the ER Program.

Set 17 covers the component removal, size reduction, and decontamination activities associated with the Type 2 buildings. Work performed within the scope of this Set will include chemical and radiological cleanup activities, and removal of equipment, buss bars, and ventilation ductwork and associated service piping and conduit in preparation for facility demolition.

The sequencing of decommissioning activities is identified in the Building 707 Closure Project Schedule, which is described in Section 9.0 and located in Appendix A of this DOP. The Sets have been prioritized based on the following considerations:

- Availability of decommissioning workers,
- Availability of specialized equipment (e.g., size reduction systems),
- Availability of storage space for process and remediation wastes,
- Availability of on-Site and/or off-Site waste treatment systems, and
- Availability of off-Site disposal facilities.

## 4.4 Facility Component Removal, Size Reduction, and Decontamination

In preparation for building demolition, facility components will be removed, size reduced, and/or decontaminated to meet applicable requirements (e.g., property reuse, waste management, and transportation requirements).

The sequence of these activities may be as described above or, where necessary, facility components may be size-reduced prior to removal or decontaminated prior to size reduction to improve efficiency and reduce worker exposure. For some equipment, size reduction and/or decontamination may not be required. Section 4.4.1 provides additional details on the component removal, size reduction, and decontamination process. Section 4.4.2 describes the methods that will be used to determine the safest, most cost-effective path to completion of the component removal, size reduction, and decontamination phase of decommissioning.

A variety of techniques are available to remove, size reduce, and decontaminate facility components. Section 4.4.3 describes the removal and size reduction techniques that may be used at RFETS, and Section 4.4.4 describes the decontamination techniques. Many of these techniques will be used to decommission the buildings within the Building 707 Closure Project. Performance specifications for the techniques include meeting the applicable unrestricted release criteria shown in Table 4; minimizing the generation of hazardous, radioactive, and mixed wastes; minimizing ES&H impacts; and complying with Project ARARs. In the event a new technique is developed and proposed for use at the Site, it will be evaluated through the ISMS and NEPA process to determine whether a modification to this DOP is required. If the impacts are determined to be different from or greater than those described in Section 7.0, Environmental Consequences, a modification will be prepared in accordance with the requirements of ¶127 of RFCA. The Building 707 Closure Project POC and DOE POC will discuss any new techniques with the LRA POC prior to use. New techniques will also be discussed with stakeholders at the periodic project status briefings.

DOE, its contractor, and subcontractors recognize that the potential for a release of hazardous and/or radioactive materials to the environment may occur both during and after removal of chainveyors, building ventilation and filtration systems, and/or contaminated portions of the building shell (e.g., an

exterior wall or section of a roof). Sections 4.4.5, 4.4.6, and 4.4.7 address the special circumstances surrounding the removal of these building components.

# Table 4. Unrestricted Release Criteria

| Contaminant | Requirement Source | Unrestricted Release Threshold | | |
|---|---|---|---|---|
| Radionuclides[28] | | Total Average | Total Maximum | Removable |
| | | (dpm/100 $cm^2$) | (dpm/100 $cm^2$) | (dpm/100 $cm^2$) |
| Transuranics | DOE Order 5400.5, Figure IV-1 | 100 | 300 | 20 |
| Th-Natural | | 1000 | 3000 | 200 |
| U-Natural | | 5000 | 15000 | 1000 |
| Beta-Gamma emitters | DOE "No-Radioactivity Added" Waste Verification Program | 5000 | 15000 | 1000 |
| Tritium | | NA | NA | 10000 |
| Hazardous Waste | 6 CCR 1007-3, Parts 261 and 268 | No listed hazardous waste or characteristic hazardous waste is present | | |
| Beryllium | 10 CFR 850.31 | The removable contamination level for equipment and other items released from beryllium work areas to the general public or for use in DOE non-beryllium areas is set at 0.2 μg/100 $cm^2$.[a] | | |
| Polychlorinated Biphenyls (PCBs) | 40 CFR 761 | <1 ppm for Bulk Remediation Waste; no threshold for Bulk Product Waste; various for PCB Items, PCB Liquids, and other PCB wastes | | |
| Asbestos-Containing Material (ACM) | 40 CFR 763<br>5 CCR-1001-10 | No sample in a sample set representing a homogeneous medium results in a positive detection (i.e., > 1percent by volume) | | |

[a] 10 CFR 850.31 imposes restrictions on the release of equipment and other items from beryllium work areas.

## 4.4.1 Overview of the Removal, Size Reduction, and Decontamination Process

Typically, facility component removal, size reduction, and decontamination activities will proceed in the sequence outlined below, although many of the activities may overlap. For instance, the pre-demolition survey may be conducted in rooms adjacent to decontamination activities, while removal activities are initiated in another part of the building. As activities are planned and executed, the RFCA consultative process will be used to provide opportunities for discussion and exchanges of information with the regulators and the general public. Detailed, step-by-step work instructions will be provided in individual IWCP work packages or activity-specific procedures.

1) Information collected during the RLC will be evaluated to determine the sampling and survey activities required to prepare the necessary work authorization documents, such as radiological work permits (RWPs) required by the RFETS Radiological Control Program, the Self-Audit Checklist and Beryllium Work Form required by the CBDPP, JHAs required by the IWCP process, and Environmental Checklists required by the Environmental Management and Compliance Group. In-process characterization will be performed to ensure work area hazards are identified, quantified, and controlled.

[28] The unrestricted release criteria for radionuclides are taken from "Application of Surface Contamination Guidelines for DOE Order 5400.5," DOE, April 23, 1998.

2) Prior to performing activities under this DOP, closure project personnel will participate in PEBs to discuss the proposed work and to review the applicable safety requirements. The LRA POC has a standing invitation to PEBs.

3) In-process characterization will be performed to ensure work area hazards are identified, quantified, and controlled.

4) Miscellaneous loose and fixed equipment and materials will be removed from the work area.

5) ACM will be identified and abated by a qualified subcontractor. The abatement activity will be carefully coordinated to minimize interference with other activities and controls will be established to avoid disturbance of ACM during other activities.

6) As necessary, equipment and horizontal surfaces within the work area will be vacuumed and/or wiped down to remove any loose radiological and non-radiological contamination. This activity will be performed to minimize personnel exposure to potentially contaminated dust during subsequent decommissioning activities.

7) Electrical power to components will be de-energized, locked out/tagged out, and disconnected. Electrical systems that cannot be de-energized or that are required for continued closure activities will be identified and marked. Temporary power will be used, as necessary.

8) Building floor drains and connections to exterior piping will be sealed and marked.

9) Remaining equipment within the work area will be removed. As a general rule, equipment located at floor level will be removed first to allow better access to overhead areas. Equipment removal may include the disassembly and decontamination of the equipment if it is determined to be cost-effective or necessary to ensure worker safety. Decontamination may be completed in place, or the equipment may be wrapped or coated to prevent the spread of contamination and moved to another area for decontamination and/or size reduction. Contamination controls may include both administrative controls (e.g., postings, roping) and engineered controls (e.g., temporary ventilation and filtration systems). Specific contamination controls will be detailed in the applicable work control documents. Facility components slated for unrestricted release will be surveyed in accordance with applicable Site procedures.

10) Items and loose debris within gloveboxes will be removed. Internal surfaces of gloveboxes may be wiped down, or more aggressive techniques may be used, such as abrasive/grit blasting or other methods described in Section 4.4.4. Lead shielding will be removed from external surfaces to minimize the generation of mixed waste.

11) Tank systems will be vented, purged, and drained to remove liquids. Ancillary piping will be removed first, using the best available method (e.g., disconnecting at a flanged joint, cutting with a wheel cutter or pipe crimping tool). Containment will be installed around the vacuum/vent lines and the tanks will be disconnected from the exhaust header. Tanks will be size reduced, as necessary to facilitate handling and packaging. Residual liquids and/or sludges in tanks and ancillary piping will be collected, characterized and managed in accordance with the applicable waste management requirements (see Section 5.0).

12) The building chainveyors will be removed as described in Section 4.4.5 of this DOP.

13) Based on radiological and/or chemical contamination levels, strippable or fixative coatings may be applied to remove or fix surface contamination during removal and size reduction operations.

14) Prior to removal of a contaminated glovebox, tank, or other component, radiological and chemical contamination control methods will be implemented to meet ES&H standards. Methods may include enclosing the component in a containment structure (e.g., tent), establishing ventilation control, use of fogging or fixative techniques, and/or decontamination. Depending on the layout of the room, the size of the component to be size reduced, and contamination levels, a containment structure may be erected around the equipment in place, or the equipment may be moved to a size reduction facility. In any case, the containment structure will be equipped with HEPA ventilation to control the spread of contamination and minimize worker exposure (see Section 4.4.3 and 4.4.4).

15) Workers may size reduce components using a variety of mechanical and thermal cutting methods, including nibblers, saws, and plasma arc and oxygen burning cutters, as described in Section 4.4.3. Size reduction will be performed to minimize waste volume and to provide for packaging in approved containers. Waste material will be characterized, managed, and packaged in accordance with applicable waste management requirements (see Section 5.0).

16) As facility components are cleared from each work area, workers will complete the removal of the remaining utilities, including ventilation and filtration systems, and electrical power within the area. Removal of ventilation and filtration systems is discussed in Section 4.4.6.

17) In the event it becomes necessary to remove a contaminated portion of the building shell (e.g., a section of an exterior wall or part of a roof), the Building 707 Closure Project POC and the DOE POC will consult with the LRA POC to determine whether the contaminated portion of the shell should be removed prior to demolition.[29] If, after reviewing the applicable survey data and considering relative risks, the Building 707 Closure Project POC, DOE POC, and LRA POC agree that removal is the safest, most protective option, the work will be planned and executed as described in Section 4.4.7 of this DOP. In addition, prior to execution of the planned activity, the Building 707 Closure Project POC and DOE POC will conduct special project status meetings as necessary to address stakeholder concerns and provide a detailed description of the activity, methods to be used, and scheduled date(s).

    The removal activities will be evaluated by a Site air quality SME, water management SME, and beryllium SME (if warranted), and appropriate controls and monitoring requirements will be identified and implemented. A structural evaluation will be conducted by a Colorado registered professional structural engineer to identify shoring requirements. Structural members will be shored, as necessary, to maintain the overall structural integrity of the building. Additional decontamination will be performed, as required. The area will then be sealed off and cross-contamination controls will be established to prevent re-contamination from activities in other work areas. Additional details regarding removal of contaminated portions of the building shell are provided in Section 4.4.7.

18) Groundwater collected in building sumps and/or vaults will be characterized and managed as incidental waters.[30] Details regarding groundwater management are provided in Section 4.5.3.7.6 (also see Table 15).

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[29] This approach is consistent with Objective No. 7 of RFCA, which reads as follows: "All contaminated buildings will be decontaminated as required for future use or demolition. Building demolition or reuse will take place after plutonium, other special nuclear material, transuranic waste, and radioactive hot-spots have been removed. In most cases, contaminated systems (such as gloveboxes, duct-work and piping) will be decontaminated and removed prior to demolition. In a few instances, contaminated systems will be decontaminated and demolished along with the building." (p. 6)

[30] Control and Disposition of Incidental Waters, 1-C91-EPR-SW.01 (latest revision).

19) After components have been removed from the work area and, if necessary, contaminated portions of the building shell have been removed, interior and exterior building surfaces (i.e., walls, floors, ceilings) will be sampled and surveyed to determine the need for further decontamination and to verify the effectiveness of the decontamination process.

20) Upon completion of the removal and decontamination activities, a PDS will be performed in accordance with the PDSP to verify that the building may be released for demolition. Results will be documented in a PDSR, which will be submitted for review and concurrence by the LRA.

### 4.4.2 Material Disposition

As depicted in Figure 7, materials generated during the facility component removal, size reduction, and decontamination phase of decommissioning generally fall into seven categories[31]:

- Uncontaminated and/or decontaminated components that may be released for reuse or recycle,
- Radiologically or chemically contaminated components that may be released to other DOE facilities or other facilities authorized for reuse or recycle,
- Waste that may be disposed of in a sanitary landfill (i.e., sanitary and special sanitary waste);
- Radioactive, hazardous, mixed, or beryllium-contaminated waste that may be treated on Site;
- Radioactive, hazardous, mixed, beryllium-contaminated, or TSCA-regulated waste that is not or cannot be treated on Site and must be disposed of in an off-Site TSD facility;
- Wastewater that may be treated on Site and released in accordance with the requirements of the RFETS National Pollutant Discharge Elimination System (NPDES) permit; and
- Wastewater that may be managed in accordance with the RFETS procedure for the control and disposition of incidental waters.[32]

Some materials may be decontaminated and rendered non-radioactive and/or non-hazardous prior to reuse, recycle, or disposal. Consistent with the objectives of RFCA, a cost-benefit analysis has been conducted to guide RFETS Closure Project Managers in determining the appropriate level and extent of decontamination and/or size reduction activities for their projects.[33] As part of the cost-benefit analysis, the costs of component removal activities were estimated, both with and without decontamination and/or size reduction. The estimate without decontamination or size reduction included a consideration of costs for component removal, property reuse or recycle, waste management, and PPE and other ES&H controls. The estimate with decontamination and size reduction included costs for component removal, additional costs associated with decontamination and size reduction (e.g., additional equipment, labor, PPE and

[31] The Site Treatment Plan describes waste streams not included in these categories.

[32] Control and Disposition of Incidental Waters (1-C91-EPR-SW.01), (latest revision).

[33] C.M. Brown, "Evaluation of Potential Cost Impacts from Volume Reduction and Decontamination for TRU-Contaminated Systems and Equipment," and "Evaluation of Potential Cost Impacts from Volume Reduction, Decontamination, or Certification to Free-Release for Low Level Waste," September 14, 1998, K-H internal documents.



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Figure 7. Material & Waste Disposition Logic Flow

other ES&H costs), and cost savings associated with decontamination and size reduction (e.g., reduced packaging, storage, shipment, treatment and disposal costs; and lower ES&H costs associated with material handling upon completion of decontamination and size reduction). Results of the analysis indicated that in most cases, neither additional decontamination above that necessary for worker safety, nor additional size reduction above that necessary to handle and package decommissioning wastes, would be cost effective. However, in the case of specific pieces of process equipment (e.g., modestly contaminated gloveboxes), the cost to decontaminate equipment to meet the DOT criteria for surface-contaminated objects (SCO),[34] and for shipment as SCO-LLW, is offset by the reduced cost to size reduce and package the material.

As the Building 707 Closure Project progresses, additional analyses may be required to compare cost impacts of new component removal techniques and approaches. These analyses will be performed as necessary, based on the logic and methodology presented in the referenced evaluations. Results of these analyses will be maintained in the Building 707 Closure Project Files.

### 4.4.3 Component Removal and Size Reduction Techniques, Hazards, Controls, and Monitoring

For the purposes of this DOP, component removal refers to the physical disassembly, size reduction (if necessary), and removal of facility components, including:

- Gloveboxes,
- Tanks and ancillary piping,[35]
- Fume hoods,
- Ventilation and filtration systems,
- Other utilities and equipment (located both inside and outside a building),
- Walls, ceilings, floors, and structural members.

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[34] The glovebox construction, level of radioactive contamination, and the presence of hazardous constituents will determine the method selected. The surface contaminated object (SCO) criteria allow some items to be removed and shipped as its own container. SCO is a U.S. Department of Transportation (DOT) category of low-level waste. SCO dispositioning is preferred because of the significant potential for reducing worker exposure levels and work hours required for removal. SCO dispositioning will be used when the following conditions are met:

- The majority of glovebox surfaces must be accessible by surveying equipment to ensure there is no concealed nuclear material inventory or holdup.
- Both fixed and removable radioactive contamination must be below the maximum allowable DOT levels.
- Inherently hazardous constituents must be removed from the exterior and interior of the glovebox, allowing the glovebox itself to be characterized as non-hazardous. Examples of hazardous constituents include leaded glass windows and lead-lined glovebox gloves. For gloveboxes that previously stored characteristic waste only, this will occur once waste residuals have been removed. Gloveboxes previously storing listed wastes will be considered non-hazardous once the "clean debris surface" standard has been met following decontamination.

[35] In accordance with Attachment 13 to RFCA, the Building 707 underground petroleum underground storage tank (UST) has been drained and filled with polyurethane foam. Although soil and groundwater samples from the required site assessment met the 5,000 total petroleum hydrocarbons (TPH) standard, the data will be reviewed by ER personnel to determine whether this information is sufficient to support a decision to close the tank in place, or whether additional information is required to make this decision. In either case, the petroleum UST will be dispositioned under an approved ER decision document.

Associated activities may also include removal of:

- Fixed lead from rooms, gloveboxes, and other equipment (e.g. lead sheeting, glove port, and glove port covers);
- Loose lead from rooms, gloveboxes, cabinets, and other equipment (e.g., lead bricks, weights);
- Fixed electronic equipment and circuit boards from rooms and equipment;
- Loose electronic equipment and circuit boards from equipment and cabinets;
- Fixed brass and bronze fittings and hardware from building structures, piping, and equipment;
- Incandescent and fluorescent bulbs from lighting fixtures and cabinets;
- Batteries from equipment and cabinets; and
- Empty aerosol cans from rooms and cabinets.

Component removal activities pose ES&H hazards that must be identified and controlled. Tables 5 through 11 present the key removal and size reduction steps by major facility component, the associated environmental hazards, and the environmental controls that may be used to mitigate those hazards. Sections 4.4.3.1.1 and 4.4.3.1.2 describe the specific techniques that will be used to disassemble and size reduce facility components, and Section 4.4.3.1.3 presents the ES&H hazards and controls associated with each technique.

Size reduction will be performed to minimize waste volume. Depending on the circumstance, size reduction activities may be performed prior to removal or subsequent to removal. Size reduction may also be performed in the area where the removal occurred, in the area where wastes will be packaged, in a central location within the building, or in a separate on-Site size reduction facility. A key step in component removal may be decontamination. The various decontamination techniques and associated controls are presented in Section 4.4.4.

# Table 5. Glovebox Removal Activities, Environmental Hazards, & Associated Controls

| Key Steps | Environmental Hazards | Environmental Controls |
|---|---|---|
| Drain glovebox piping and criticality drains into containers using gravity, pumps, compressed air, and/or vacuum system | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Decontaminate glovebox, if necessary (see Section 4.4.4) | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Disconnect glovebox by detaching lines | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Size reduce glovebox, if necessary (see Sections 4.4.3.1.1 and 4.4.3.1.2) | Radioactive and/or hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Haul away glovebox - may use mechanical lifting and hauling devices such as hoists, cranes, lift tables, machinery dollies, forklifts; and may containerize cut-up components | Radioactive and hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Seal glovebox openings (if glovebox is not containerized).<br>Use spray fixative and/or stretch-wrapping if exterior is contaminated and exposed (i.e., not containerized).<br>Package property for reuse or recycle in accordance with receiving facility acceptance criteria and DOT shipping requirements.<br>Package waste in accordance with disposal facility WAC and DOT shipping requirements (see Sections 4.4.6 and 4.4.7). |

# Table 6. Tank Removal Activities, Environmental Hazards, & Associated Controls

| Key Steps | Environmental Hazards | Environmental Controls |
|---|---|---|
| Drain tank into containers using gravity, pumps, compressed air, and/or vacuum system; remove raschig rings (if applicable) and residual liquids and sludges | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Disconnect tank by detaching ancillary lines | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Excavate tank and ancillary lines (if necessary) | Radioactive and/or hazardous liquids and air emissions released to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Plan and implement removal per content-specific industry standards, regulations, and Site requirements.<br>Inspect and approve equipment prior to use.<br>Use certified operators. |
| Decontaminate tank, if necessary (see Section 4.4.4) | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Size reduce tank, if necessary (see Sections 4.4.3.1.1 and 4.4.3.1.2) | Radioactive and/or hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be exposed.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Haul away tank - may use mechanical lifting and hauling devices such as hoists, cranes, lift tables, machinery dollies, and forklifts; and may containerize cut-up components | Radioactive and/or hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Seal tank openings; use spray fixative and stretch-wrapping if item exterior is contaminated.<br>Package property for reuse or recycle in accordance with receiving facility acceptance criteria and DOT shipping requirements.<br>Package waste in accordance with disposal facility WAC and DOT shipping requirements. |



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# Table 7. Piping Removal Activities, Environmental Hazards, & Associated Controls

| Key Steps | Environmental Hazards | Environmental Controls |
|---|---|---|
| Drain piping into containers using gravity, pumps, compressed air, and/or vacuum system | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Disconnect piping (see Sections 4.4.3.1.1 and 4.4.3.1.2) | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Decontaminate piping, if necessary (see Section 4.4.4) | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Size reduce piping, if necessary (see Sections 4.4.3.1.1 and 4.4.3.1.2) | Radioactive and/or hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be exposed.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Containerize piping and haul away | Radioactive and/or hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Seal openings and use spray fixative and/or stretch-wrapping if exterior is contaminated and exposed (i.e., not containerized).<br>Package property for reuse or recycle in accordance with receiving facility acceptance criteria and DOT shipping requirements.<br>Package waste in accordance with disposal facility WAC and DOT shipping requirements. |

# Table 8. Fume Hood and Ventilation/Filtration System Removal Activities, Environmental Hazards, & Associated Controls

| Key Steps | Environmental Hazards | Environmental Controls |
|---|---|---|
| Disconnect system (see Section 4.4.5) | Radioactive and/or hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Decontaminate system, if necessary (see Section 4.4.4) | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Size reduce system, if necessary (see Sections 4.4.3.1.1 and 4.4.3.1.2) | Radioactive and/or hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be exposed.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Haul away system using mechanical lifting and hauling devices such as hoists, cranes, lift tables, machinery dollies, and forklifts; may containerize system components | Radioactive and/or hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Seal openings and use spray fixative and/or stretch-wrapping if item exterior is contaminated and exposed (i.e., not containerized).<br>Package property for reuse or recycle in accordance with receiving facility acceptance criteria and DOT shipping requirements.<br>Package waste in accordance with disposal facility WAC and DOT shipping requirements. |

# Table 9. Chainveyor Removal Activities, Environmental Hazards, & Associated Controls

| Key Steps | Environmental Hazards | Environmental Controls |
|---|---|---|
| Disconnect system (see Section 4.4.5) | Radioactive and/or hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be exposed.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Decontaminate system, if necessary (see Section 4.4.4) | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be exposed.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Size reduce system, if necessary (see Sections 4.4.3.1.1 and 4.4.3.1.2) | Radioactive and/or hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be exposed.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Haul away system using mechanical lifting and hauling devices such as hoists, cranes, lift tables, machinery dollies, and forklifts; may containerize system components | Radioactive and/or hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Seal openings and use spray fixative and/or stretch-wrapping if item exterior is contaminated and exposed (i.e., not containerized).<br>Package property for reuse or recycle in accordance with receiving facility acceptance criteria and DOT shipping requirements.<br>Package waste in accordance with disposal facility WAC and DOT shipping requirements. |

# Table 10. Equipment Removal Activities, Environmental Hazards, & Associated Controls

| Key Steps | Environmental Hazards | Environmental Controls |
|---|---|---|
| Drain equipment into containers using gravity, pumps, and/or compressed air | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Disconnect equipment by detaching ancillary lines | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Decontaminate equipment, if necessary (see Section 4.4.4) | Radioactive and/or hazardous liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Size reduce equipment, if necessary (see Sections 4.4.3.1.1 and 4.4.3.1.2) | Radioactive and/or hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be exposed.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Haul away equipment using mechanical lifting and hauling devices such as hoists and cranes; may contain, cranes, lift tables, machinery dollies, and forklifts; containerize cut-up components | Radioactive and/or hazardous air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Seal equipment openings and use spray fixative and/or stretch-wrapping if exterior is contaminated and exposed (i.e., not containerized).<br>Package property for reuse or recycle in accordance with receiving facility acceptance criteria and DOT shipping requirements.<br>Package waste in accordance with disposal facility WAC and DOT shipping requirements. |

# Table 11. Wall/Floor/Ceiling Removal Activities, Environmental Hazards, & Associated Controls

| Key Steps | Environmental Hazards | Environmental Controls |
|---|---|---|
| Decontaminate wall, floor, and/or ceiling, if necessary (see Section 4.4.4) | Radioactive liquids and air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be drained or exposed.<br>Collect liquids in critically safe containers. If liquids are highly contaminated, cover adjacent surfaces with plastic or other protective material.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Dismantle wall, floor, and/or ceiling (see Sections 4.4.3.1.1 and 4.4.3.1.2) | Radioactive air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Maintain a negative pressure between the work area and surrounding environment.<br>Construct temporary containment around the work area if very high levels of radioactive materials are to be exposed.<br>Use building and/or temporary HEPA filtration system and project-specific and/or Site-wide air monitoring network (see Sections 4.4.6 and 4.4.7). |
| Haul away sections using mechanical lifting and hauling devices such as hoists, cranes, lift tables, machinery dollies, and forklifts; containerize rubble | Radioactive air emissions released into the building and to the environment | Conduct ES&H reviews prior to activity (see Section 4.1).<br>Package property for reuse or recycle in accordance with receiving facility acceptance criteria and DOT shipping requirements.<br>Package waste in accordance with disposal facility WAC and DOT shipping requirements.<br>Conform with the requirements of the RSOP for Recycling Concrete. |

## *4.4.3.1 Component Removal and Size Reduction Techniques*

Techniques used to disassemble, and/or size reduce facility components may be categorized as mechanical disassembly and cutting techniques, and thermal cutting techniques. Mechanical techniques employ manual, electrical, pneumatic, and/or hydraulic forces (e.g., shear) and motions (e.g., reciprocating, circular) to cut and/or break equipment or systems into pieces. Thermal techniques produce a flame or electrical arc to cut and/or break the equipment or systems by melting them. Techniques used to remove facility components may involve the use of common construction equipment, including excavators (e.g., backhoes), hoists, and cranes.

Mechanical techniques include simple disassembly using hand tools or power saws and shears, circular cutters, crimpers, abrasive cutters, diamond wire cutters, paving breakers (i.e., jackhammers), pulverizers, grapples, rams, and non-explosive cracking agents. Thermal techniques include plasma arc, oxygen-burning, and laser cutters; arc saws; and abrasive water-jet cutters. In general, mechanical techniques are most appropriate for cutting wood, plastic, glass, concrete, and thin metal (i.e., < 3/8" thickness) systems and components, such as piping. Thermal techniques are most often used to cut thicker metal, such as gloveboxes, chainveyors, heavy equipment, and tank systems. Most of these mechanical and thermal techniques may be hand-held, stationary, or configured for remote control.

In 1998, the RFETS Technology Steering Committee examined a variety of size reduction techniques for use during decommissioning. Currently, advanced size reduction techniques are being evaluated, including robotics and remote-operated vehicles. As part of this effort, a controlled technology deployment has been initiated to promote worker safety, minimize waste generation, and increase cost effectiveness. Initial efforts were based on soft-sided containment tents in which size reduction activities would be performed. Subsequent efforts have focused on the development and deployment of the hard-sided Inner Tent Demolition Chamber (ITDC). Other size reduction techniques currently under consideration include the Remote operations Size Reduction System (ROSRS) and In-Situ Size Reduction System (ISSRS), which would use mobile robots to perform mechanical and thermal size reduction operations.

After facility components have been disconnected and disassembled, they will be size reduced and/or decontaminated (if necessary), then packaged for reuse, recycle, or disposal. Removal of large items, such as tanks, equipment, and sections of walls and flooring, will be accomplished using mechanical lifting and hauling devices, such as hoists and cranes. Excavators, such as backhoes, will be used to excavate around and access underground components, such as underground storage tanks and ancillary lines. Such devices will be inspected and approved for the work, and operated by qualified operators. If contaminated, items will be contained prior to removal to prevent the release and spread of contamination (e.g., the item will be sprayed with a fixative and stretch-wrapped). Excavation work will be conducted in accordance with the OS&IH Program Manual, which includes requirements for soil disturbance permits.

#### *4.4.3.1.1 Mechanical Removal and Size Reduction Techniques*

Mechanical techniques include small tools, such as hand-held saws with hardened-steel blades, which cut through construction materials, such as wood, plastics, glass, Plexiglas®, Benelex®, lead, and glovebox filters. Hydraulic shears are two-bladed tools that operate on the same principle as a conventional pair of scissors. Shears may be hand-held or mounted on a skid or excavator, which provides hydraulic power and a mechanism for manipulating the shears. A shear baler is a device that may be used to reduce an entire glovebox into a high-density bale that will fit into a standard waste box.

Split-frame pipe and tool cutters are designed to cut in-line piping. These devices are mounted around the outside diameter of a section of pipe and will sever, bevel, and counterbore the material being worked. Diamond wire cutting involves a series of guide pulleys that draw a continuous loop of multi-strand wire strung with diamond beads and spacers through the surface to be cut. High-pressure water cutters use water mixed with an abrasive, such as garnet, to cut through steel. Typically, high-pressure water cutters are mounted on an automated, multi-axis system. Arbor presses are devices used to press odd-sized pieces of metal, such as glovebox corners and tubing, into manageable pieces.

Non-explosive cracking agents may be used to fracture concrete. The cracking agent is a powder, liquid, or putty that is mixed with water and poured into holes drilled in concrete. As it hardens, pressures up to 12,000 psi are exerted, causing the concrete to fracture.

#### *4.4.3.1.2 Thermal Removal and Size Reduction Techniques*

Thermal techniques include plasma and electric arc cutters, which operate by establishing a direct current arc in a gas or gas mixture that flows through the cutting torch nozzle to the metal being cut. A stream of positively charged ions and free electrons is ejected from the torch nozzle at a very high velocity, melting the metal. During cutting, the molten metal is ejected in the form of fine sparks, which are blown away from the torch head. Oxygen burning cutters use a flowing mixture of fuel gas and oxygen ignited at the torch head to heat metal to high temperatures and "burn" it away. One such system consists of a torch that feeds oxygen and electrical power to an exothermic cutting rod, which is placed in direct contact with the

piece to be cut, then dragged in the direction of the cut. Laser cutting systems melt and vaporize the metal.

#### 4.4.3.1.3 ES&H Hazards, Controls, and Monitoring

Removal and size reduction techniques and activities present hazards to workers and the environment. Therefore, removal and size reduction activities will be carefully planned to include detailed area characterization and hazard evaluations. Decontamination will be considered prior to the use of removal and size reduction techniques when elevated levels of contamination are present. Engineering and administrative controls (e.g., localized ventilation and RWPs) will be implemented, as necessary, to maintain employee exposure ALARA. Robotics may also be employed. Some removal and size reduction techniques will be performed after ventilation and filtration systems have been removed; therefore, personnel and environmental monitoring will be implemented commensurate with the risk. Environmental monitoring may include Site-wide and project-specific air and surface water monitoring, especially if activities occur outdoors within an Individual Hazardous Substance Site (IHSS). In addition, removal and size reduction activities will be reviewed by the various environmental management SMEs (e.g., air and water) to determine the appropriate controls. For example, run-on controls will be used to divert run-off from excavation sites, especially if they are located within an IHSS, and any accumulated water will be managed in accordance with the stormwater provisions of the Site NPDES permit, the Spill Prevention, Control, and Countermeasures Plan[36], and the Stormwater Pollution Prevention Plan.[37] Also, radiological engineers will establish project-specific work controls in areas contaminated by radionuclides, including work suspension limits based on project-specific hazards. Doses to workers and the public will be calculated, and air monitoring will be performed to meet the applicable regulatory standards (e.g., 40 CFR 61, Subpart H and Colorado Air Quality Control Commission Regulation No. 8). Table 12 summarizes the hazards and controls associated with each of the component removal techniques described in this section.

[36] RFETS Spill Prevention, Control, and Countermeasures Plan (RMRS-21000-SPCC), (latest revision).

[37] RFETS Stormwater Pollution Prevention Plan (RMRS-21000-SWPPP), (when approved).

# Table 12. Component Removal/Size Reduction Hazards & Controls

| Removal Technique(s) | Potential Hazards | Hazard Controls | Comments |
|---|---|---|---|
| Hand tools (hammers, wood saws, metal saws, screw drivers, pliers, sheet metal cutters, wrenches, etc.)<br><br>Power tools (drills, circular saws, reciprocating saws, shears) | Cuts, abrasions, punctures, electrocution, and other bodily injury<br><br>Eye hazards from airborne chips, cuttings and fragments<br><br>Potential for radiological and chemical exposure and contamination, including wound contamination<br><br>Potential to spread contamination and cause contaminants to become airborne (e.g., from exhaust and cooling air blowing on contaminated surfaces)<br><br>Explosive hazard using sparking tools (e.g., drill motors) in areas where volatile chemicals have been used | Training on job-specific hazards, related procedures, and proper use of tools<br><br>PPE and personnel monitoring<br><br>Periodic tool inspections and inspection of tools prior to use<br><br>Decontamination and use of fixatives prior to elevated contamination levels are present<br><br>Use of engineering and administrative controls, including containment and ventilation/filtration systems, postings, RWPs, and other ALARA principles, to control exposure (e.g., shielding, time and distance)<br><br>"Hot Work" permit (i.e., permit to work on energized equipment) | Contamination levels will be identified prior to use (as access allows).<br><br>Workers who will perform the work determine the best tool for the task.<br><br>Training will be provided for new and unique operations.<br><br>Engineering controls are the primary means to minimize personnel exposure to the hazard. PPE is the backup and supplements the engineering controls to allow the work to be completed.<br><br>Air and personnel monitoring will be performed, as appropriate, to determine the effectiveness of decontamination and engineering controls.<br><br>Use of sparking tool is not allowed in an explosive environment. |
| Paving breakers, jackhammers, and similar tools to break up concrete | Pressurized connections, bodily injury from blade point and flying objects, eye hazard, noise<br><br>Potential for radiological and chemical exposure and contamination, including wound contamination<br><br>Personnel injury due to vibration<br><br>Personnel injury due to improper lifting of heavy equipment<br><br>Potential to spread contamination and cause contaminants to become airborne | Training on job-specific hazards, related procedures, and the proper use of equipment<br><br>PPE and personnel monitoring<br><br>Periodic equipment inspections and inspection of equipment prior to use<br><br>Decontamination and use of fixatives prior to use if elevated contamination levels are present<br><br>Use of engineering and administrative controls, including containment and ventilation/filtration systems, postings, RWPs, and other ALARA principles, to control exposure (e.g., shielding, time and distance) | Contamination levels will be identified prior to use (as access allows).<br><br>Workers who will perform the work determine the best tool for the task.<br><br>Workers will be trained in the proper lifting techniques.<br><br>Engineering controls are the primary means to minimize personnel exposure to the hazard. PPE is the backup and supplements the engineering controls to allow the work to be completed. |

# Table 12. Component Removal/Size Reduction Hazards & Controls

| Removal Technique(s) | Potential Hazards | Hazard Controls | Comments |
|---|---|---|---|
| | | | PPE will include special vibration gloves and work controls will include frequent personnel rotation.<br><br>Air and personnel monitoring will be performed, as appropriate, to determine the effectiveness of decontamination and engineering controls. |
| Plasma and electric arc cutters | Fire<br><br>Bodily injury, including blindness and burns, hearing impairment, and smoke inhalation<br><br>Potential for radiological and chemical exposure and contamination, including wound contamination<br><br>Potential to spread contamination and cause contaminants to become airborne | Control of combustibles in the work area<br><br>Use of spark and light shields<br><br>Verification of fire protection adequacy, including establishment of fire watch, as necessary<br><br>Training on job-specific hazards, related procedures, and the proper use of equipment<br><br>PPE and personnel monitoring<br><br>Periodic equipment inspections and inspection of equipment prior to use<br><br>Decontamination prior to use if there are elevated contamination levels<br><br>Use of engineering and administrative controls, including containment and ventilation/filtration systems, postings, RWPs, and other ALARA principles, to control exposure (e.g., shielding, time and distance)<br><br>"Hot Work" permit (i.e., permit to work on energized equipment) | Relief space behind work piece is required.<br><br>Combustibles will be removed from the work area.<br><br>Contamination levels will be identified prior to use (as access allows).<br><br>Workers who will perform the work will determine the best tool for the task.<br><br>Engineering controls are the primary means to minimize personnel exposure to the hazard. PPE is the backup and supplements the engineering controls to allow the work to be completed.<br><br>Air and personnel monitoring will be performed, as appropriate, to determine the effectiveness of decontamination and engineering controls.<br><br>Task-specific requirements will be included in the hot work permit (e.g., removal of paint from work surface). |

# Table 12. Component Removal/Size Reduction Hazards & Controls

| Removal Technique(s) | Potential Hazards | Hazard Controls | Comments |
|---|---|---|---|
| Oxy-torch cutters | Fire<br><br>Bodily injury, including blindness and burns, hearing impairment<br><br>Potential for radiological and chemical exposure and contamination, including wound contamination<br><br>Potential to spread contamination and cause contaminants to become airborne | Control of combustibles in the work area<br><br>Training on job-specific hazards, related procedures, and the proper use of equipment<br><br>PPE and personnel monitoring<br><br>Periodic equipment inspections and inspection of equipment prior to use<br><br>Decontamination prior to use if elevated contamination levels are present<br><br>Use of engineering and administrative controls, including containment and ventilation/filtration systems, postings, RWPs, and other ALARA principles, to control exposure (e.g., shielding, time and distance)<br><br>"Hot Work" permit (i.e., permit to work on energized equipment) | Combustibles will be removed from the work area.<br><br>Contamination levels will be identified prior to use (as access allows).<br><br>Air and personnel monitoring will be performed as appropriate to determine the effectiveness of decontamination and controls and to monitor for potential uptakes, exposure of Site population, and off-Site releases. |
| Laser cutters | Fire<br><br>Eye hazard, skin wounds, and electrocution<br><br>Potential for radiological and chemical exposure and contamination, including wound contamination<br><br>Potential to spread contamination and cause contaminants to become airborne | Control of combustibles in the work area<br><br>Training on job-specific hazards, related procedures, and the proper use of equipment<br><br>PPE and personnel monitoring<br><br>Periodic equipment inspections and inspection of equipment prior to use<br><br>Decontamination and use of fixatives prior to use if elevated contamination levels are present<br><br>Use of engineering and administrative controls, including containment and ventilation/filtration systems, postings, RWPs, and other ALARA principles, to control exposure (e.g., shielding, time and distance) | Contamination levels will be identified prior to use (as access allows).<br><br>Combustibles will be removed from the work area.<br><br>Air and personnel monitoring will be performed as appropriate to determine the effectiveness of decontamination and controls and to monitor for potential uptakes. |

# Table 12. Component Removal/Size Reduction Hazards & Controls

| Removal Technique(s) | Potential Hazards | Hazard Controls | Comments |
|---|---|---|---|
| Diamond wire saws | Flying objects if wire breaks and related bodily harm, hearing impairment, and eye hazard<br>Potential for radiological and chemical exposure and contamination, including wound contamination<br>Potential to spread contamination and cause contaminants to become airborne | Training on job-specific hazards, related procedures, and the proper use of equipment<br>PPE and personnel monitoring<br>Periodic equipment inspections and inspection of equipment prior to use<br>Decontamination prior to use if elevated contamination levels are present<br>Use of engineering and administrative controls, including containment and ventilation/filtration systems, postings, RWPs, and other ALARA principles, to control exposure (e.g., shielding, time and distance) | Workers must have access to both sides of the material to be cut.<br>Contamination levels will be identified prior to use (as access allows).<br>Combustibles will be removed from the work area.<br>Workers who will perform the work determine the best tool for the task.<br>Engineering controls are the primary means to minimize personnel exposure to the hazard. PPE is a backup and supplements the engineering controls to allow the work to be completed.<br>Air and personnel monitoring will be performed, as appropriate, to determine the effectiveness of decontamination and engineering controls. |
| Wachs cutters, hydraulic shears, shear bailers, water cutters (using abrasives), arc air slice, and arbor press | Bodily injury from pressurized connections (i.e., cutters and flying objects)<br>Cuts from sharp edges<br>Hearing impairment due to high noise<br>Potential for radiological and chemical exposure<br>Potential to spread contamination<br>Potential to cause contamination to become airborne | Training on job-specific hazards, related procedures, and the proper use of equipment<br>PPE (e.g., use of leather gloves, hearing protection) and personnel monitoring<br>Periodic equipment inspections and inspection of equipment prior to use<br>Shielding of highly pressurized fittings<br>Decontamination prior to use if elevated contamination levels are present | Contamination levels will be identified prior to use (as access allows).<br>Workers who will perform the work determine the best tool for the task.<br>Engineering controls are the primary means to minimize personnel exposure to the hazard. PPE is a backup and supplements the engineering controls to allow the work to be completed. |

# Table 12. Component Removal/Size Reduction Hazards & Controls

| Removal Technique(s) | Potential Hazards | Hazard Controls | Comments |
|---|---|---|---|
| | | Use of engineering and administrative controls, including containment and ventilation/filtration systems, postings, RWPs, and other ALARA principles, to control exposure (e.g., shielding, time and distance) | Air and personnel monitoring will be performed, as appropriate, to determine the effectiveness of decontamination and engineering controls. |
| Non-explosive cracking agents | Bodily injury, eye hazard (drilling required to create holes into which cracking agent is introduced)<br>Trips and falls due to exposed voids<br>Potential release of contamination within building or to the environment<br>Fugitive particulates | Training on job-specific hazards, related procedures, and the proper use of equipment<br>PPE and personnel monitoring<br>Periodic equipment inspections and inspection of equipment prior to use<br>Decontamination prior to use if elevated levels of contamination are present<br>Use of engineering and administrative controls, including containment and ventilation/filtration systems, postings, RWPs, and other ALARA principles, to control exposure (e.g., shielding, time and distance) | Contamination levels will be identified prior to use (as access allows).<br>Workers who will perform the work determine the best tool for the task.<br>Engineering controls are the primary means to minimize personnel exposure to the hazard. PPE is a backup and supplements the engineering controls to allow the work to be completed.<br>Air and personnel monitoring will be performed, as appropriate, to determine the effectiveness of decontamination and engineering controls. |
| Excavators, hoists, cranes, lift tables, machinery dollies, and forklifts | Bodily injury<br>Falling load<br>Damage to property<br>Potential release of contamination within building or to the environment, including releases resulting from excavation activities conducted within IHSSs | Preparation and use of a Lifting Plan<br>Training on job-specific hazards, related procedures, and the proper use of equipment<br>PPE and personnel monitoring<br>Periodic equipment inspections and inspection of equipment prior to use<br>Coordination with environmental management SMEs (e.g., air and water quality) and implementation of additional monitoring and other controls as necessary to prevent or minimize contaminant migration | Required equipment operation certifications will be current. |

## 4.4.4 Decontamination Techniques, Hazards, Controls, and Monitoring

Decontamination is defined as the removal of contamination from building and equipment surfaces and beneath surfaces by manual, mechanical, chemical, or other means. The purpose of decontamination is to reduce exposure to radiological and chemical hazards, minimize the generation of radioactive and hazardous waste, and to salvage equipment and materials for future use. Depending on the circumstance, decontamination activities may be performed prior to removal or subsequent to removal. Decontamination may also be performed in the area where the removal occurred, in the area where wastes are to be packaged, in a central location within a building, or in a separate on-Site decontamination facility, depending on operational safety and cost-effectiveness. In many cases, the techniques discussed below are effective for both radioactive and chemical contamination. The decision process used to determine the nature and extent of decontamination is summarized in Figure 8. The logic used to select the most appropriate decontamination technique(s) is summarized in Figure 9.

Manual and mechanical decontamination techniques may be classified as either surface cleaning (e.g., vacuuming, wiping, scrubbing, washing, application and removal of strippable coatings) or surface removal (e.g., abrasive blasting, grinding, spalling, scarifying). Manual and mechanical techniques are most effective on porous and non-porous surfaces that are easily accessible, such as floors and walls.

Chemical decontamination techniques employ concentrated or dilute solutions to erode or flush loose contaminated debris from a surface, or to dissolve the contamination. Chemical decontamination techniques are most effective on non-porous surfaces that are relatively inaccessible, such as interior pipe surfaces.

### *4.4.4.1 Manual and Mechanical Decontamination Techniques*

Manual and mechanical decontamination techniques include vacuuming, wiping, scrubbing, and washing, which involve the physical removal of dust, fine particles, and loose debris from building and equipment surfaces using common cleaning techniques. Typically, dusting involves the use of a dry cloth and wiping involves the use of a damp cloth, which may be soaked with water, detergent, or non-hazardous solvent to assist in removing particulates. Washing and scrubbing are similar to wiping except that pressure is applied to assist in removing the contamination. Vacuuming involves the physical removal of particulates or liquids with a suction device. Particulates are removed using a commercial- or industrial-grade vacuum equipped with a HEPA filter. Liquids are removed using a "wet vacuum" equipped with an alternate filtration system. Hydolasing uses a high-pressure (i.e., several thousand pounds per square inch) water jet to remove contaminated debris from large and/or inaccessible surfaces. System configurations range from a jet tip, which produces a narrow stream, to a fan-shaped tip, which produces a flat stream. Strippable coatings may be applied to contaminated surfaces, then removed with some of the contamination. Strippable coatings are applied using a mixture of two polymers that chemically react to form the coating. Usually, the contaminated layer is pulled off, containerized, and disposed of as contaminated waste. Decontamination factors for the strippable coatings vary with the type of coating used. In general, strippable coatings are only effective on smooth, non-porous surfaces.

Scarifiers are used to abrade coated and uncoated concrete and steel surfaces. The scarification process physically removes contaminated surface layers. For steel surfaces, scarifiers may completely remove contaminated coating systems, including mill scale. This leaves a surface of bare metal. A scabbling scarification process may be used to achieve the desired profile and results for contaminated concrete. A needle-scaling scarification process may be used for steel decontamination. Vacuum attachments may be used to reduce the spread of contamination associated with the scarification process.

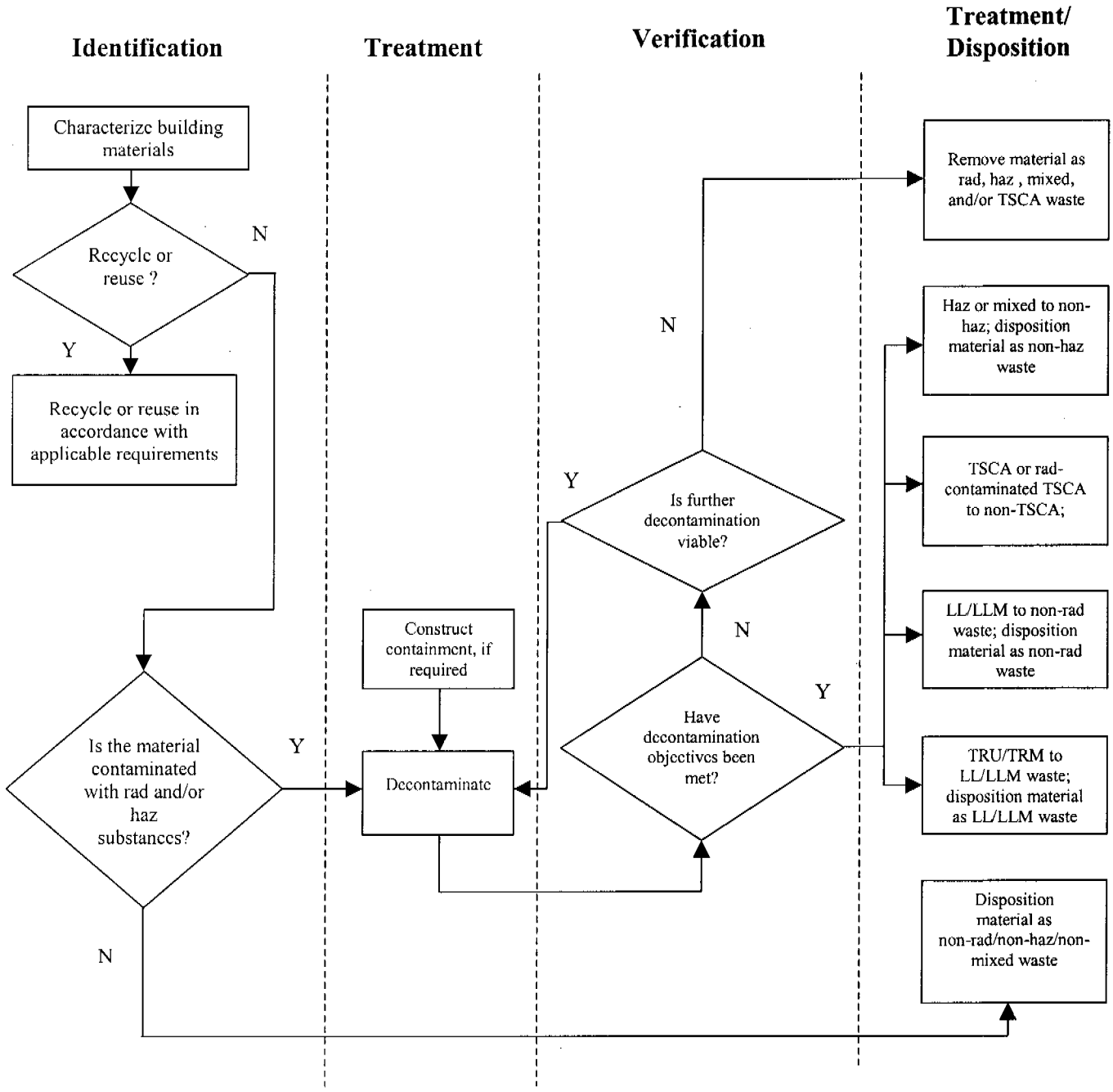


Figure 8. Decontamination Decision Tree

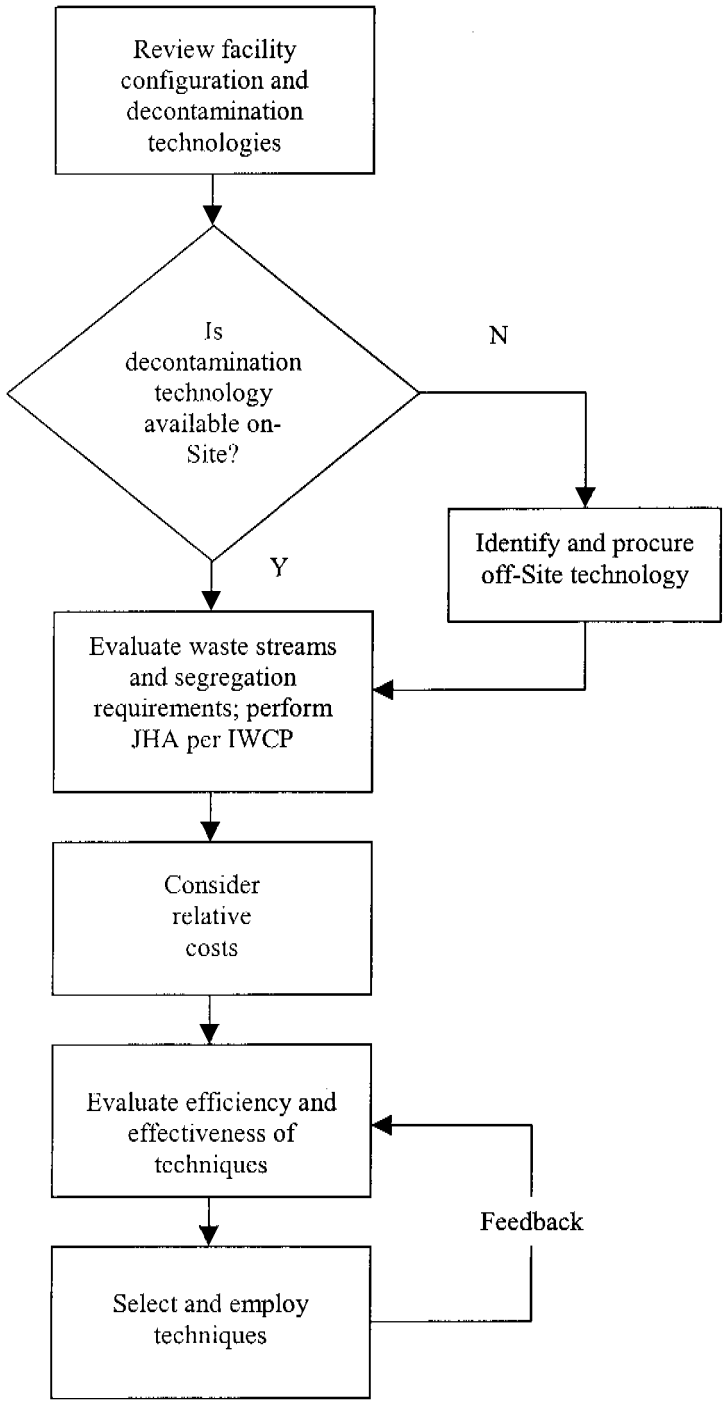


Figure 9. Decontamination Technique Selection Logic

Paving breakers and chipping hammers are used to remove contamination and surface material by mechanical impact, referred to as spalling. Although paving breakers and chipping hammers are primarily used in demolition activities, they may also be used to remove surface contamination up to six inches thick, resulting in a rough remaining surface.

Grit blasting, also referred to as sand blasting or abrasive jetting, uses abrasive materials suspended in a medium (e.g., compressed air, water, or a combination of air and water) to pulverize and grind out surface contaminants. Typically, blasting results in the uniform abrasion of a surface. Typical abrasives include minerals, steel pellets, glass beads, glass frit, plastic pellets, and natural products, such as sand. Grit blasting systems consist of a blast gun, pressure lines, abrasives, and air compressor.

Carbon dioxide ($CO_2$) blasting is a variation of grit blasting, where $CO_2$ pellets are used as the abrasive medium. The pellets shatter as they impact the surface, penetrating the base material and releasing the contaminants. The $CO_2$ fragments immediately sublimate, adding a lifting force, which aids in removing the contaminants. Abraded debris falls to the ground, and the $CO_2$, now a gas, returns to the atmosphere.

### *4.4.4.2 Chemical Decontamination Techniques*

Water is a universal decontamination agent that acts by dissolving contamination or by eroding and flushing loose debris from the contaminated surface. It is most effective on non-porous surfaces, and may be made more effective by increasing its temperature, adding a detergent or surfactant, or using a water jet.

Detergents are used to remove grease, dirt, and some organic materials. Surfactants produce similar results by lowering liquid surface tension and providing better contact between the surface and the liquid.

Strong mineral acids, such as hydrochloric acid (HCl), nitric acid ($HNO_3$), sulfuric acid ($H_2SO_4$), and phosphoric acid ($H_3PO_4$), cerium nitrate $Ce(NO_3)_4$, and organic or weak acids, such as oxalic acid ($C_2H_2O_4$), citric acid ($C_6H_8O_6$), and sulfamic acid ($HSO_3NH_2$) may be used to remove contamination by dissolving metal oxide films and increasing the solubility of the metal ions.

### *4.4.4.3 ES&H Controls and Monitoring*

Decontamination may be complex due to the type and form of the contaminant, and the surface characteristics of the material to be decontaminated. As a result, accepted decontamination techniques will be used, and detailed information regarding the contaminants present, the type of contamination (e.g., fixed versus removable, liquid versus solid), the areal extent and levels of contamination, and the properties of the contaminated material(s) will be considered.

Many of the decontamination techniques described above are useful in a broad number of applications, including low levels to very high levels of contamination. Pre-decontamination planning, area characterization, and hazard evaluations will be performed to select the most effective technique(s) for each application. Areas of highest contamination will be considered for removal or decontamination first, and areas with loose contamination will be decontaminated before areas with fixed contamination. Engineering and administrative controls will be implemented, as necessary, to reduce personnel exposure to contamination, and confirmatory sampling and analysis will be performed to verify the decontamination activities have been successful. Table 13 summarizes the hazards and controls associated with each of the decontamination techniques described in this section.

# Table 13. Decontamination Hazards & Controls

| Decontamination Technique | Associated Hazards | Hazard Controls | Comments |
|---|---|---|---|
| Wiping, scrubbing, and/or washing with detergent | Potential to spread contamination and cause contaminants to become airborne<br>Potential for personnel contamination when using liquids for decontamination<br>Electrical hazard from energized equipment<br>Potential for nuclear criticality | Provide training on job-specific hazards and related procedures.<br>Use proper PPE to prevent personnel contamination.<br>Use engineering and administrative controls, including containment and ventilation/filtration, postings, RWPs, and other ALARA principles, to control personnel exposure (e.g., shielding, time and distance).<br>De-energize equipment prior to decontamination.<br>Use appropriate system to collect, store, and treat wastewater. | Contamination levels will be identified prior to use (as access allows).<br>Dusting (i.e., dry decontamination) should never be performed in areas where contaminated dust may be re-suspended and released to the environment.<br>Sanitary drains will be blocked to prevent contaminated water from reaching the sanitary sewer.<br>Air monitoring will be performed. |
| Vacuuming | Potential for nuclear criticality and/or elevated dose rates from consolidation of material<br>Potential to spread contamination due to filter failure and/or exhaust ventilation of vacuum in areas of higher contamination | Provide training on job-specific hazards and related procedures.<br>Use proper PPE to prevent personnel contamination.<br>Use HEPA-filtered vacuums.<br>Use critically safe vacuum (i.e., vacuum cleaner that cannot accumulate a critical mass of fissile material) if the amount of material to be vacuumed is significant.<br>Conduct radiation surveys to identify maximum amounts of material that may be safely decontaminated. The required survey frequencies (e.g., for dose rates, HEPA filter testing, and filter change-out/cleaning) will be identified in the applicable work control documents.<br>Use engineering and administrative controls, including containment and ventilation/filtration, postings, RWPs, and other ALARA principles, to control exposure (e.g., shielding, time and distance). | Contamination levels will be identified prior to use (as access allows).<br>Will identify maximum material amounts that can be safely decontaminated, survey frequencies for dose rates, DOP testing frequencies, and filter change-out/cleaning frequencies.<br>Air monitoring will be performed. |
| Strippable coatings | Skin and eye contact hazards; fumes and vapors | Perform frequent dose rate surveys of stripped material if there is a potential for elevated dose rates. | Air monitoring will be performed.<br>Contamination surveys will be performed on bare materials after paint has been stripped. |

# Table 13. Decontamination Hazards & Controls

| Decontamination Technique | Associated Hazards | Hazard Controls | Comments |
|---|---|---|---|
| | Potential for elevated dose rates due to build-up in removed paint<br>Potential elevated contamination levels as coatings are removed<br>Criticality potential as coatings are removed and containerized<br>Electrical hazard from energized equipment | Provide training on job-specific hazards and related procedures.<br>Use proper PPE to prevent personnel contamination.<br>Use engineering and administrative controls, including containment and ventilation/filtration, postings, RWPs, and other ALARA principles, to control exposure (e.g., shielding, time and distance).<br>Use engineering and administrative controls to ensure a critical mass cannot be accumulated.<br>De-energize equipment prior to decontamination. | |
| Hydrolasing and/or high-pressure steam cleaning | Potential to spread contamination<br>Potential for contamination to become airborne<br>Potential for personnel contamination<br>Potential for electrical hazards if energized equipment is present<br>Eye and noise hazard<br>Potential for bodily harm (e.g., cutting skin/bone, burns from steam) | Provide training on job-specific hazards, related procedures, and equipment.<br>Inspect equipment prior to use.<br>Use proper PPE, including hearing protection.<br>Use engineering and administrative controls, including containment and ventilation/filtration systems, postings, RWPs, and other ALARA principles, to control exposure (e.g., shielding, time and distance).<br>De-energize equipment prior to decontamination.<br>Use appropriate system to collect, store, and treat wastewater.<br>Rotate personnel and closely monitor personnel for signs of fatigue. | Contamination levels will be identified prior to use (as access allows).<br>Areas of higher contamination can be wet down prior to using higher pressures.<br>Air monitoring will be performed.<br>Use appropriate amount of pressure to safely decontaminate material<br>Sanitary drains will be blocked, as necessary, to prevent contaminated water from reaching the sanitary sewer. |
| Grinders, scarifiers, scabblers, paving breakers, chipping hammers, and/or spalling | Potential to spread contamination<br>Potential for contamination to become airborne<br>Potential for personnel contamination<br>Physical, eye, and noise hazards | Provide training on job-specific hazards, related procedures, and equipment.<br>Inspect equipment prior to use.<br>Use proper PPE, including hearing protection and vibration protection gloves. | Contamination levels will be identified prior to use (as access allows).<br>Air monitoring will be performed. |

# Table 13. Decontamination Hazards & Controls

| Decontamination Technique | Associated Hazards | Hazard Controls | Comments |
|---|---|---|---|
| | High vibration and motion of equipment | Use engineering and administrative controls, including containment and ventilation/filtration systems, postings, RWPs, and other ALARA principles, to control exposure.<br>Rotate personnel and closely monitor personnel for signs of fatigue. | |
| Abrasive/grit blasting | Potential to spread contamination<br>Potential for contamination to become airborne<br>Potential for personnel contamination<br>Physical, eye and noise hazards | Provide training on job-specific hazards, related procedures, and equipment.<br>Inspect equipment prior to use.<br>Use proper PPE, including hearing protection.<br>Use engineering and administrative controls, including containment and ventilation/filtration systems, postings, RWPs, and other ALARA principles, to control exposure (e.g., shielding, time and distance). | Contamination levels will be identified prior to use (as access allows).<br>Air monitoring will be performed. |
| Carbon dioxide ($CO_2$) blasting | Potential to spread contamination and cause contaminants to become airborne<br>Potential for personnel contamination<br>Physical, eye and noise hazards<br>Potential for carbon dioxide buildup | Provide training on job-specific hazards, related procedures, and equipment.<br>Inspect equipment prior to use.<br>Use proper PPE, including hearing protection.<br>Use engineering and administrative controls, including containment and ventilation/filtration systems, postings, RWPs, and other ALARA principles, to control exposure. | Contamination levels will be identified prior to use (as access allows).<br>Air monitoring will be performed, including $CO_2$ monitoring. |
| Strong mineral acids and/or cerium nitrate | Potential to spread contamination<br>Potential for contamination to become airborne<br>Potential for personnel contamination | Provide training on job-specific hazards and related procedures.<br>Use proper PPE.<br>Use engineering and administrative controls, including containment and ventilation/filtration systems, postings, RWPs, and other ALARA principles, to | Contamination levels will be identified prior to use (as access allows).<br>Type of contaminants and incompatibles will be known in advance.<br>Will use least toxic and/or diluted chemicals that can safely achieve desired level of |

# Table 13. Decontamination Hazards & Controls

| Decontamination Technique | Associated Hazards | Hazard Controls | Comments |
|---|---|---|---|
| | Skin and eye contact hazards; fumes and vapor<br>Hazards associated with use of incompatible chemicals<br>Electrical hazard from energized equipment | control exposure (e.g., shielding, time and distance) and to prevent use of incompatible chemicals.<br>De-energize equipment prior to decontamination.<br>Use appropriate system to collect, store, and treat wastewater. | decontamination.<br>Air monitoring will be performed.<br>Sanitary drains will be blocked to prevent contaminated water from reaching the sanitary sewer. |

### 4.4.5 Removal of the Building Chainveyor System

Transfer systems built inside the Building 707 chainveyors are used to move nuclear material between gloveboxes within a single module and between modules. The chainveyor system is shown in Figure 10.

The chainveyors are rectangular in shape and flanged at each end. The flanges are bolted together to provide an air-tight housing. Typically, the chainveyors are located near the dropped ceiling to minimize operator interference. The chainveyors also serve to direct ventilation flow and maintain containment during material transfer. Lead shielding mounted on the outside of the chainveyors is used to reduce personnel exposure.

During decommissioning, the chainveyors will be disassembled and lowered to the floor in sections. The sections will be size reduced (if necessary) and packaged for off-Site disposal. Lead shielding will be removed prior to packaging. The removal sequence will vary from location to location. For example, the chainveyor that runs through Modules D and E may be removed with Module D or Module E, or it may be left in place and removed at the time Corridor M components are removed. However, because the chainveyors have internal contamination, the openings to each section will be contained (e.g., sealed with plastic and tape) during the removal process, and ventilation through the chainveyor will be maintained, as necessary, to prevent the release of contamination.

### 4.4.6 Removal of Building Ventilation and Filtration Systems

As facility components are removed and/or decontaminated, workers will complete the removal of remaining utilities, including building ventilation and filtration systems. Because ventilation and filtration systems are important environmental controls, and because some of these systems may contain radiological and/or chemical contamination, the removal of these systems poses a potential for releases of hazardous and/or radioactive materials to the environment. As a result, the removal sequence is extremely important and will be planned carefully for each Type 3 and Type 2 building within the Building 707 Closure Project Typically, the removal sequence will proceed as described below, and as depicted in Figure 11.

1) Early in the work planning process, project engineers, building stationary operating engineers, and radiological engineers will perform air-flow studies in accordance with the DOE-approved RFETS Radiological Control Manual to identify ventilation requirements for the activity (i.e., whether the existing ventilation must be adjusted and/or whether additional temporary ventilation must be added).

2) Zone I plenums and associated filtration systems will be maintained until the gloveboxes and ductwork they service have been stripped out.

3) Where possible, gloveboxes will be removed "upstream to downstream" (i.e., towards the filter plenums) to ensure that air continues to flow from areas of least contamination to areas of higher contamination. During this time, radiological engineers will verify that air is continuing to flow from areas of least contamination to areas of greater contamination and they will work with the building stationary operating engineers to ensure negative pressure is maintained in accordance with applicable AB requirements (i.e., the Building 707 BIO). Air flow will be maintained in the desired direction using the remaining Zone I and Zone II systems and/or temporary ventilation and filtration systems, as necessary.



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Persons with access to Unclassified Controlled Nuclear Information (UCNI) may obtain this information from the Building 707 Closure Project Manager.

# Figure 10. Building 707 Chainveyor System

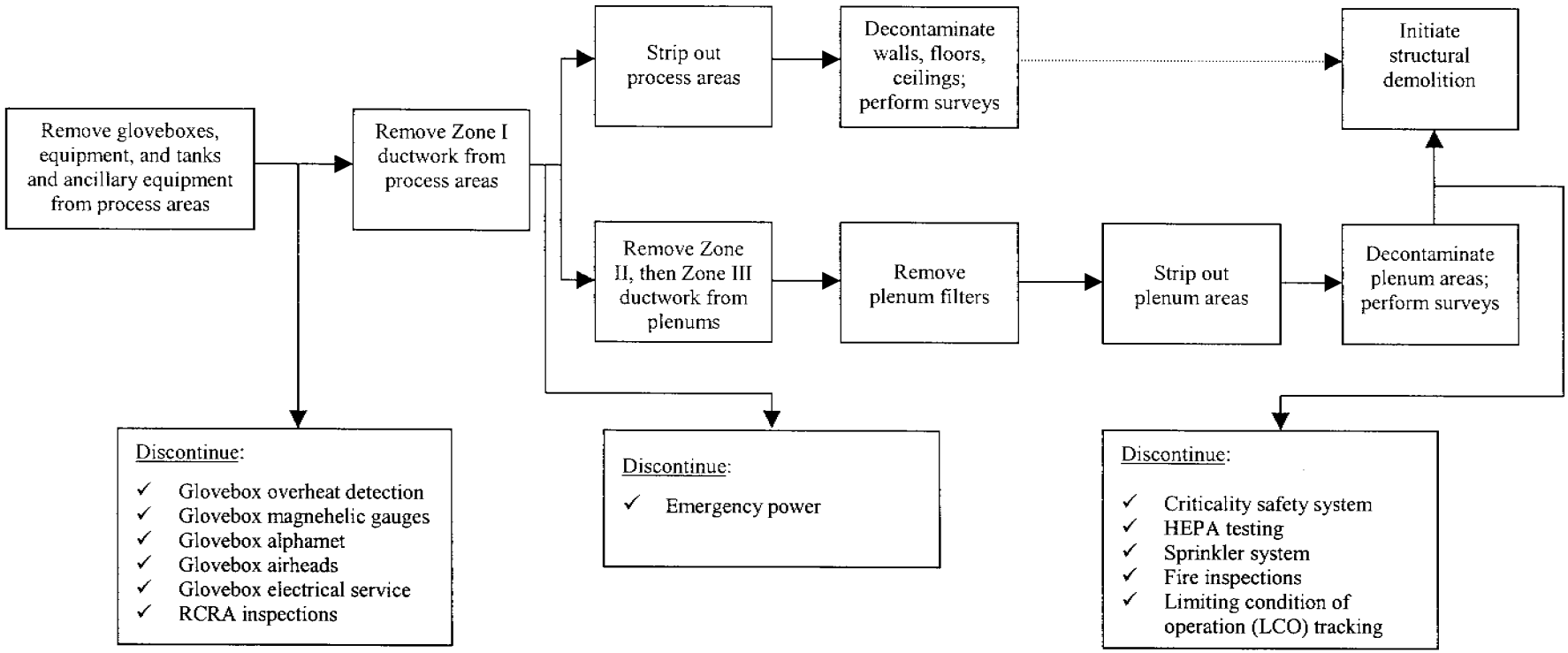


Figure 11. Removal Sequence for Building Ventilation and Filtration Systems

4) Zone I gloveboxes and ductwork have been removed from the area or rooms they service, and those areas or rooms have been controlled (i.e., contained or decontaminated to meet applicable decontamination goals), the Zone II and then Zone III plenums and associated ductwork may be removed. During this time, radiological engineers will verify that air is continuing to flow from areas of least contamination to areas of greater contamination, and they will work with the building stationary operating engineers to ensure negative pressure is maintained in accordance with applicable AB requirements (i.e., the Building 707 Basis for Interim Operation [BIO]). Air flow will be maintained in the desired direction using the remaining Zone I and Zone II systems and/or temporary ventilation and filtration systems, as necessary.

5) Some ductwork may be removed without removing associated holdup to maintain worker exposure ALARA. In such cases, criticality safety reviews will be conducted and controls implemented in accordance with the applicable requirements of the DOE-approved Site Nuclear Criticality Safety Manual.

Activity-specific IWCP work packages will be prepared for each project, containing step-by-step instructions for all ventilation and filtration system removal work. Work instructions will be based on project-specific hazard analyses and hazard controls. In addition, proposed activities will be reviewed by the various environmental management SMEs (e.g., air quality, water quality). Doses to workers and the public will be calculated, controls will be implemented to meet the applicable regulatory standards (e.g., 40 CFR 61, Subpart H, and Colorado Air Quality Control Commission Regulation No. 8), and environmental monitoring will be conducted, as required.

### 4.4.7 Removal of Contaminated Portions of the Building Shell

It is the intent of DOE and its contractor to decontaminate all contaminated portions of the building shell (i.e., walls, floors, ceilings, roofs, and other structural members) to meet the applicable criteria for unrestricted release demolition in accordance with the RSOP for Facility Disposition. However, in the event the material disposition analysis shows that decontamination will pose a significant risk to workers and/or public health and safety and the environment, or decontamination is not economically feasible, the Building 707 Closure Project POC and the DOE POC will consult with the LRA POC to determine whether the contaminated portion of the shell should be removed prior to demolition.[38] If, after reviewing the applicable survey data and considering relative risks, the Building 707 Closure Project POC, DOE POC, and LRA POC agree that removal is the safest, most protective option, the work will be planned as described below. In addition, prior to execution of the planned removal activity, the Building 707 Closure Project POC and DOE POC will conduct special project status meetings as necessary to address stakeholder concerns and provide a detailed description of the activity, methods to be used, and scheduled date(s).

The following paragraphs describe the requirements for performing these removal activities in preparation for facility demolition. Activity-specific IWCP work packages will be prepared for each project, containing step-by-step instructions for all removal work. Work instructions will be based on project-specific hazard analyses and hazard controls.

[38] This approach is consistent with Objective No. 7 of RFCA, which reads as follows: "All contaminated buildings will be decontaminated as required for future use or demolition. Building demolition or reuse will take place after plutonium, other special nuclear material, transuranic waste, and radioactive hot-spots have been removed. In most cases, contaminated systems (such as gloveboxes, duct-work and piping) will be decontaminated and removed prior to demolition. In a few instances, contaminated systems will be decontaminated and demolished along with the building." (p. 6)

### *4.4.7.1 Prerequisites for Removing Contaminated Portions of the Building Shell*

As described below, six analyses will be conducted in preparation for the removal of a contaminated portion of the building shell.

- **Relative Costs**: First, the Building 707 Closure Project Manager will consider relative costs in accordance with Section 4.4.2 of this DOP. If it is not feasible to decontaminate the member (e.g., the entire structural member is contaminated and it cannot be decontaminated without destroying it), this analysis will not be required; however, the unique circumstances will be documented in the Project Record.
- **Structural Evaluation**: Second, a structural evaluation will be performed to identify the engineering controls required to allow for the safe removal of the contaminated member (e.g., shoring, installation of temporary supports, use of a crane or boom truck). This engineering evaluation will be certified by a Colorado registered professional engineer.
- **Air Emissions**: A third analysis will be conducted to assess the potential for emissions of radionuclides, beryllium, and other hazardous air pollutants to the environment, and to ensure compliance with the applicable air quality requirements.[39] This analysis will be performed by a Site air quality SME, pursuant to air quality management requirements, which include characterizing the nature and extent of contamination, calculating related emissions to the atmosphere, calculating ambient concentrations and/or resultant doses to the public, and comparing estimated concentrations and/or doses to the applicable regulatory limits. Emission controls will be identified and, if warranted, an Enhanced Air Monitoring Plan will be developed to augment the Site-wide monitoring network and provide for continuous monitoring of emissions from the removal activity.[40]
- **Dust Generation**: A fourth analysis will be performed by a Site air quality SME to assess the potential for dust generation and to establish required controls in accordance with the contractor-approved Air Quality Management Plan.
- **Impacts to Surface Water**: A fifth analysis will be performed by personnel from the Environmental Media Management Group and Water Operations Group to assess potential impacts to surface water, ensure compliance with applicable surface water action levels, and to establish required controls in accordance with stormwater provisions of the Site NPDES permit, the RFETS Stormwater Pollution Pollution Prevention Plan, and the Site IMP. Depending on the particular circumstances, groundwater may be a component pathway in this analysis.
- **Impacts to Migratory Birds**: Finally, a survey will be conducted to ensure the planned removal activities will not impact migratory birds or their nests. Migratory birds are protected by the Migratory Bird Treaty Act[41] and the Wildlife Conservation Act[42], which prohibit the removal or destruction of bird nests without a permit from the U. S. Fish and Wildlife Service. As a result, during the early stages of project planning and scheduling, the closure project team will work with a Site ecologist to take preventive measures to discourage nesting or to obtain the required nest removal permit(s).

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39 National Emission Standards for the Emissions of Radionuclides Other Than Radon From Department of Energy Facilities, 40 CFR 61, Subpart H, and Colorado Air Quality Control Commission Regulation No. 8.

40 Enhanced monitoring is discussed in Section 4 the Site Integrated Monitoring Plan (latest revision).

41 Migratory Bird Treaty Act, 16 USC 701 *et seq.*

42 Fish and Wildlife Conservation Act, 16 USC 661 *et seq.*

### *4.4.7.2 Shell Removal Sequence*

Typically, removal of a contaminated portion of the building shell will proceed as described below. Project-specific requirements, including ES&H controls, will be described in the applicable IWCP work packages and/or other WCD(s), which will be prepared prior to initiation of shell removal activities.

- Initial surveys will be performed to ensure that contamination located inside the building, behind the contaminated section of shell, has been removed.
- Additional surveys will be performed to identify the boundaries of contamination surrounding the contaminated section of the shell, and to develop a safety margin around the contaminated area. A safety margin is a boundary outlined around the contaminated area, up to where mechanical removal methods can be used prior to initiating cutting techniques.
- The contaminated portion of the building shell will be removed using one of the removal techniques described in Section 4.4 of this DOP.
- Emissions from the removal activity will be controlled by shielding the contaminated member from the environment (e.g., a fixative may be applied to the contaminated member, the exposed sections of the member may be wrapped in plastic sheeting, a tent may be erected around the member, and/or a wind wall may be constructed to shield the member). Fugitive particulate emissions will be controlled by loading facility debris into covered containers, applying water in a controlled manner, and/or terminating removal activities during periods of high wind.[43]
- The area around the contaminated member will be inspected to identify potential pathways for migration of contaminants, including roof and floor drains, cracks, seams, and floor/wall intersections. Pathways will be closed by covering or filling (e.g., plastic sheeting or grout). Surface water (i.e., stormwater run-on and run-off) will be controlled using standard construction methods, including silt fences, hay bales, and diversion ditches (see Appendix B for details). Surface water controls will be selected and implemented on a project-by-project basis, in accordance with the Spill Prevention, Control, and Countermeasures (SPCC) Plan and Stormwater Pollution Prevention Plan. As necessary, berms will be designed and installed based on project location, project-specific hazards, and anticipated storm events. Design criteria will include total capacity and freeboard requirements. Water from dust control and/or cutting activities, as well as any accumulated stormwater or groundwater, will be managed in accordance with the surface water provisions of the Site's NPDES permit and Stormwater Pollution Prevention Plan. Surface water monitoring will be conducted in accordance with the RFETS IMP. Comprehensive monitoring of decommissioning activities within the Industrial Area is covered by the new source detection (NSD) monitoring objective. NSD monitoring stations are located at the outflow points of each major drainage within the Industrial Area. Contamination detected by an NSD monitoring station cannot be traced back to the source project. As a result, project-specific performance monitoring will be conducted to isolate individual decommissioning activities. The RFETS IMP performance monitoring objectives provide a template to guide the decision process for determining performance monitoring requirements.
- Air monitoring will be performed in accordance with the requirements of the Site IMP. The existing RFETS Radioactive Ambient Air Monitoring Program (RAAMP) sampler network will be used for ambient air monitoring during removal activities. The RAAMP sampler network continuously monitors airborne dispersion of radioactive materials from the Site into the surrounding environment. Thirty-seven samplers comprise the RAAMP network. Fourteen of these samplers are deployed at the Site perimeter and are used to confirm Site compliance with the 10 millirem (mrem) dose standard mandated in 40 CFR 61, Subpart H. Filters from the 14

[43] At RFETS, the high wind threshold is typically 30 mph (sustained), as prescribed by the Site Shift Superintendent.



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perimeter RAAMP samplers and from one on-Site sampler near the 903 Pad are collected and analyzed monthly for uranium, plutonium, and americium isotopes. In addition to the perimeter network, enhanced ambient air sampling will be performed on an as-needed basis using RAAMP samplers in the immediate vicinity of the individual removal activities. Based on job hazards identified during the IWCP planning process, suspension limits will be established to stop work, evaluate monitoring results, and modify controls, as necessary. Results will be compiled and submitted annually for incorporation into the Radionuclide Air Emissions Annual Report.

# 4.5 Facility Demolition

The demolition phase of decommissioning includes removal of the building shell, slab, foundation or facility footing to a depth at least three feet below ground surface. The soil beneath the facility is not within the scope of this DOP. It will be addressed during the ER phase of the Building 707 Closure Project.

## 4.5.1 Pre-Demolition Survey

Prior to facility demolition, a PDS will be conducted to verify the nature and extent of radiological and chemical contamination in the facility. The survey will be conducted in accordance with DDCP. In general, the characterization process will incorporate the following steps:

- The 707 Closure Project team will develop characterization packages and take final measurements and samples.
- DOE and the LRA will review the sampling results.
- DOE and/or the LRA will conduct an independent verification (IV) of the characterization data, if required.
- The LRA, at its discretion, will review the results from the IV.
- During the characterization process, the LRA will have access to the facilities to collect samples and measurements, at its discretion.

The PDS is intended to verify that the condition of the survey unit meets the requirements for demolition and disposal as provided in this DOP. The PDS is conducted in accordance with the requirements of the PDSP. The types of data necessary to satisfy the objectives of PDS include total surface contamination measurements, removable surface contamination measurements, and scan data. Surface media sampling will only be required on a limited basis, given that suspect surface media will be removed during decommissioning.

Additional information required to design the PDS includes in-process survey data and updated maps to reflect structural alterations. In-process surveys are performed to assess the changing radiological conditions during the course of decommissioning and to confirm that an area is free of gross contamination. In-process survey data will be incorporated into the PDSR, which will be submitted for review and concurrence by the LRA. If isolation controls are successfully maintained for the duration of the Building 707 Closure Project, the PDS will not be repeated for Type 1 facilities. Verification surveys will be performed before final closure to confirm that radioactive material was not introduced into these structures. Structures such as administrative support trailers, guard stations and trailers, and auxiliary support trailers are included in this category.

Non-radiological contaminants will be addressed at the in-process characterization phase of decommissioning. In general, non-radiological contaminants will have been removed before the PDS begins and very little, if any, additional sampling will be needed. The non-radiological sampling methodology will be documented in the PDSR.

Based upon available information and data, the following sampling plan is recommended to support the PDS for both radiological and non-radiological constituents:

- Building surfaces will be divided into survey units based on the requirements outlined in the PDSP. The types of measurements that will be performed during PDS include total surface contamination, removable surface contamination, and surface scans.
- Surface media samples may also be required on a limited basis.
- An IV survey may be performed on an established percentage of survey units following the completion of the PDS. The IV contractor will be selected and funded by the DOE and/or the LRA to maintain independence from Building 707 Closure Project personnel.

### 4.5.2 Demolition Planning and Execution

Demolition activities will be planned at an appropriate time in the closure process, prior to completion of the PDS. Actual demolition will not proceed until the LRA has concurred with the PDSR and the Building 707 Closure Project POC and DOE POC have conducted special project status meetings as necessary to address stakeholder concerns and provide a detailed description of the planned demolition activity, methods to be used, and scheduled date(s).

A qualified, experienced demolition contractor will perform the necessary demolition activities for the Building 707 Closure Project, and a Colorado registered professional structural engineer and certified safety professional will continuously monitor demolition activities to ensure they are conducted safely. The qualification requirements for the contractor will be documented in the scope of work. The demolition contractor will prepare a Demolition Plan prior to initiating demolition activities. The Demolition Plan will be prepared in accordance with Occupational Safety and Health Act (OSHA), 29 CFR 1926, Subpart T, and will detail the methods to be used to collapse the facility. At a minimum, the Demolition Plan will contain the following information:

- An engineered survey of the structure that determines the condition of the framing, floors, and walls;
- Shoring and bracing requirements and information for facilities that have been damaged by fire, flood, explosion, or other cause;
- Water run-on and run-off control, dust suppression, and air monitoring requirements;
- Shut-off, capping, and control measures for all electric, gas, water, steam, sewer, and other service lines;
- Temporary relocation and/or protection for any utilities that need to be maintained through demolition activities;
- Elimination or control of any remaining hazardous chemicals, gases, explosives, flammable materials, or dangerous substances;
- Removal of glass and implementation of fall protection in areas where falling through a wall opening taller than 42 inches will be possible;
- Cordoning off areas where material will be dropped without a chute with barricades not less than 42 inches high and not less than six feet back from the protected edge of the opening;
- Covering of all floor openings with material substantial enough to support the weight of any reasonably expected load;
- The sequence of demolition activities, which will generally start from the top of the structure and proceed downward. The exterior walls of the top stories will be dropped before the exterior wall

on the lower floors. Exceptions can be made for cutting holes in floors for chutes, holes for dropping materials, and preparation of storage space; and

- Protection of employee entrances with sidewalk sheds and canopies.

The general sequence of activities associated with the demolition of facilities within the Building 707 Closure Project will proceed as follows:

- Mobilization,
- Demolition site preparation,
- Removal of overhead obstructions,
- Removal of Site features required to execute demolition (paved lots and streets for ease of access, retaining walls, inactive exterior fire system components),
- Demolition of outbuildings and Site features (e.g., cooling towers, trailers, tanks, outbuildings, ASTs),
- Demolition of Building 707 to a depth at least three feet below grade,
- Placement of an engineered backfill of the Building 707 footprint,
- Demolition site cleanup, and
- Demobilization.

The demolition process will begin with the mobilization of the demolition contractor followed by demolition site preparation. A central staging area will be established in an existing improved area, such as the paved area between Buildings 707 and 750. The demolition contractor may mobilize the following items: office trailers, shower facilities, lunchroom, portable toilets, hand wash units, and tool/equipment storage. The existing PA security fence will be incorporated into an overall access control boundary.

As part of demolition site preparation, existing features associated with Site utility systems will be located, marked, and evaluated for isolation purposes. The sanitary sewer system will be isolated to prevent inflow of inappropriate wastewater generated by demolition dust control activities.

Electrical power requirements will be identified as a part of the planning process. Maintaining sump and foundation pumps for control of groundwater, power to sanitary sewer lift stations, and some area lighting will be necessary. However, it is likely that all power fed from the main distribution system will eventually be terminated and decommissioning activities will be supported by temporary power.

Protective barriers or fences will be erected around permanent Site features designated to remain during demolition and ER. Electrical distribution switch gear, overhead electrical distribution lines, area lighting, and fire protection system hydrants and post indicator valves that will remain operational during and/or after facility demolition will be protected, as required, and flagged for added operator awareness and overall visibility.

As necessary, run-on and run-off controls will be implemented, temporary diversion berms, erosion control silt fencing, and interceptor ditches will be installed, and existing drainage culverts and ditches will be clean out as required to divert significant overland flow away from the demolition site. The installation of run-on/run-off control features will be coordinated with Environmental Management personnel responsible for the surface water monitoring system surrounding the demolition area.

Traffic patterns and loading areas will be established to facilitate waste management activities and temporary stockpile areas will be established for building debris. Backfill material that will be stockpiled for a long period of time will be stored in a more permanent area, which will include erosion and run-on/run-off controls, as necessary. The location of any long-term backfill stockpile area will be

coordinated with the ER Program. In addition, any known contaminated surficial soils in the areas immediately adjacent to planned demolition activities will be delineated and also coordinated with the ER Program.

Initial demolition activities will involve stripping remnant equipment, rooftop entry/landing deterrent systems, ventilation stacks, filter housings, and other miscellaneous materials from rooftops. The removal of overhead obstructions will reduce the possibility of equipment coming in contact with energized electrical lines, and will allow access for operating cranes and long-reach tracked excavators. Remnant equipment will be removed early in the process to free up the roof system for removal of potential ACM in the membrane of structures with older roofing systems.

## 4.5.3 Demolition Techniques, Hazards, Controls, and Monitoring

Facility demolition will involve large mechanical equipment, which may include wrecking ball or crane; excavators equipped with a hydraulic hoe-ram and grapple; and/or front-end loaders, which will be used to demolish, size reduce, segregate, and load the concrete, steel and other facility materials into waste containers or stockpiles. The primary demolition steps and mechanical techniques for dismantling, segmenting, and demolishing will be provided in activity-specific IWCP work packages. The following paragraphs describe the demolition equipment. The equipment manufacturer and/or supplier operations and maintenance requirements will be followed. The Demolition Plan will indicate which methods will be used during demolition activities and the IWCP work packages will detail the methods. Figure 12 illustrates the demolition method(s) selection process.

### *4.5.3.1 Wrecking Ball*

A wrecking ball is generally used for demolishing non-reinforced or lightly reinforced concrete structures less than three feet thick. The equipment consists of a 2- to 5- ton ball suspended from a crane boom. The industry standard method of use is to raise the ball with a crane between 10 to 20 feet above the structure and release the cable brake, allowing the ball to drop onto the target surface. This method achieves good fragmentation of the structure, maintains maximum control of the ball after impact, and maintains control of the debris by dropping the debris within the footprint of the facility. The wrecking ball is recommended for non-radioactive concrete structures because the release of dust is difficult to control. Dust suppression methods are discussed in Section 4.5.3.7.

### *4.5.3.2 Excavator Mounted Attachments*

Excavator mounted attachments are industry standard for a wide variety of demolition projects, and provide controlled demolition. Controlled demolition means various attachments mounted to an excavator are used to methodically disassemble a structure. The basic attachments to an excavator include concrete pulverizers, shears, grapples, and rams. The attachments perform the following functions:

- Pulverizers crush concrete and separates rebar and encased steel beams.
- Shears sever metals, structural steel, wood, rubber, and plastic.
- Grapples serve as an all-purpose tool for demolition and material handling.
- Rams demolish concrete structures up to six feet thick with a moil or chisel point.

Concrete pulverizer jaws are capable of separating rebar and embedded steel beams from concrete. Plate shears are used for clean cutting steel plate up to 1¼ inches thick. The plate shears are more applicable to decommissioning and can be used to dismantle above and below ground tanks and to cut separated rebar.

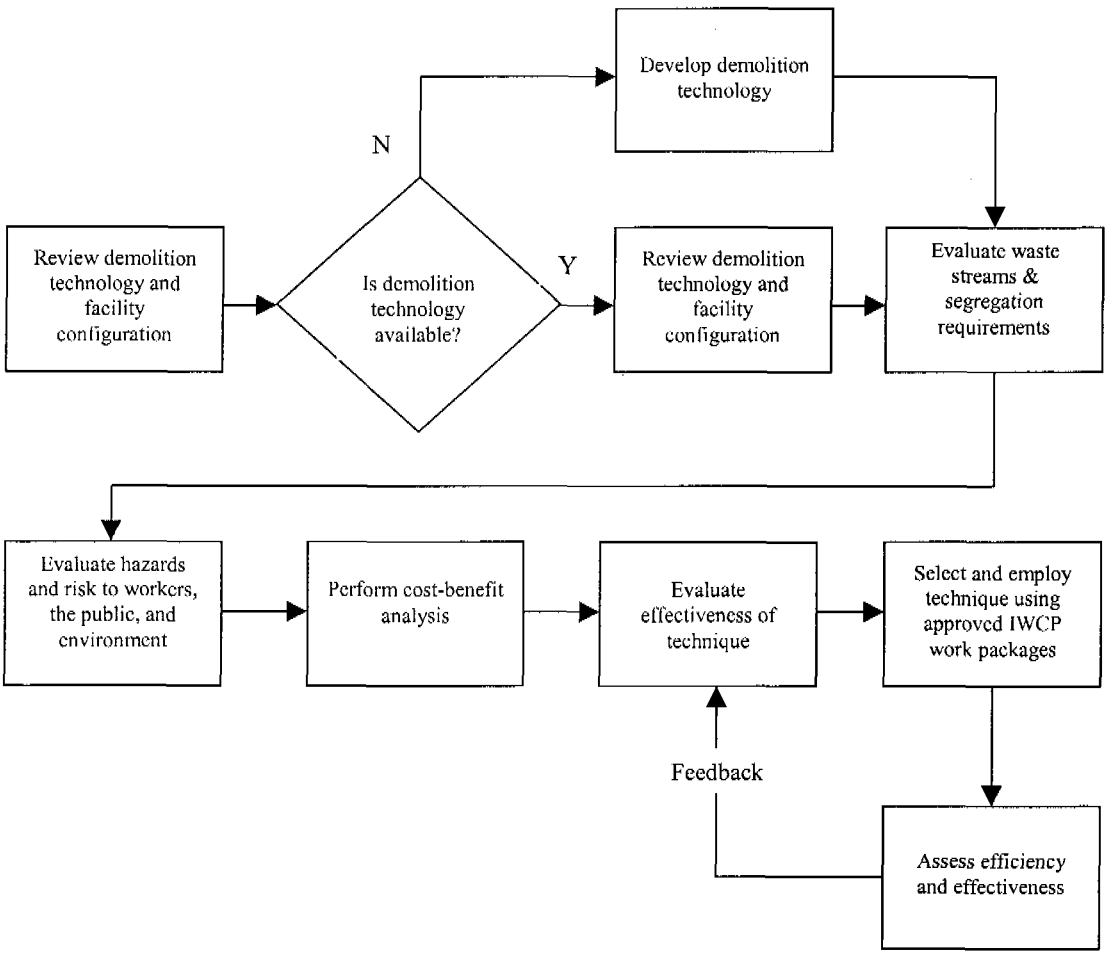


Figure 12. Demolition Method Selection Process

Grapples are versatile and provide a wide range of uses including demolition, scrap recycling, and material handling. Grapples may be used as an alternative to loaders and buckets as a tool for demolition cleanup.

The ram is a resistance driven tool that begins operating as soon as the chisel point touches the work piece and stops as soon as the chisel is lifted or clear the work piece. Air powered rams are used for lightly reinforced concrete that is less that two feet thick. Hydraulic rams can be used for demolition of much larger sections of concrete, up to six feet thick, and are available with heads capable of delivering approximately 7,000 to 10,000 foot pounds of energy per blow.

### *4.5.3.3 Diamond Wire Cutting*

Diamond wire cutting involves a series of guide pulleys that draw a loop of multi strand wire strung with a series of diamond beads and spacers through a cut. The required length of the wire is obtained by assembling standard length sections of wire end-to-end using screwed sleeves. A contact tension is kept on the wire, and this force with the spinning wire cuts a path through concrete and rebar. Linear wire speed is adjustable from approximately 0 to 5,900 feet per minute, and wire tension can be adjusted from approximately 1 to 330 pounds. The wire is wrapped around the object to be cut and tension is applied. If an internal cut is required, drilling is necessary to allow the wire too be fed through the holes. Concrete of almost any thickness can be cut with this technique.

A benefit of the wire cutting is the flexibility of the pulley system, which allows cutting at unusual configurations. This flexibility also allows easy and safe cutting in areas with restricted access and remote cutting in hazardous and radioactive environments.

### *4.5.3.4 Cabling*

Cabling involves the use of a large cable and one or more bulldozers. A cable is sized so that it will fit around the facility and withstand the pressure of bulldozer and the facility weight. The cable is wrapped around the facility and attached to one or more bulldozers. The bulldozer size and number is dependent on the size of the facility. The bulldozers apply tension to the cable until the facility collapses.

### *4.5.3.5 Non-Explosive Cracking Agent*

A non-explosive cracking agent is a chemical that may be used to fracture concrete. The cracking agent is a powder, liquid, or putty that is mixed with water and poured into holes, as it hardens, it exerts pressures up to approximately 12,000 psi, which fractures the concrete. The cracking agent does not work instantly; it often takes up to 12 hours to fracture the concrete.

There are several types of non-explosive cracking agent and each manufacturer will have a specific method for using the agent. Generally, several holes are drilled in the area to be fractured. The hole diameter and depth must be sized according to manufacturer's recommendation, but are generally not larger than 1½ inches in diameter or 10 feet in depth.

Non-explosive cracking agents are generally not cost effective in slabs less than five inches. Non-explosive cracking agents can be used in combination with other methods. The cracking agent will produce cracks, and an excavator with attachments can complete the demolition activity. If non-explosive cracking agents are used, the IWCP work package will include the manufacturer's recommendations, a step-by-step procedure, Material Safety Data Sheets (MSDSs), and checklist for using the cracking agent.

### 4.5.3.6 Explosives

The use of explosives for facility demolition will require extensive planning using the Demolition Plan and IWCP work packages or other appropriate WCDs. A subcontractor specializing in controlled demolition through the use of explosive materials will be selected. The Demolition Plan will outline the detailed steps involved in the activity, including the test shot, type, and placement of explosive material, and the shot sequence. The IWCP work package will contain checklists that verify the steps required before, during, and after placement of the explosive materials, and the safety measures employed to ensure worker health and safety.

A facility walkthrough will be conducted with the explosives subcontractor and appropriate Site personnel. During this time, original structural drawings will be reviewed and core samples will be collected. The samples will be used in calculations to determine the type and quantity of explosive materials required. A test shot will be conducted to verify the calculations. The test shot will involve setting and activating the proposed explosive material on a non-structural portion of the facility to verify the concrete fracturing.

The use of explosives will be evaluated for effects on worker health and safety and the environment, and for cost-effectiveness as compared to mechanical demolition techniques. The safety and economic evaluations will be documented and included in the Project's AR File, along with the qualifications of the selected demolition subcontractor. Due to the age and condition of some of the facilities within the Building 707 Closure Project, the use of explosives may be the only safe method of demolition.

Prior to the initiation of any demolition activity involving the use of explosives, the Building 707 Closure Project POC and the DOE POC will consult with the LRA POC. If, after considering relative risks, the LRA POC agrees that the use of explosives is the safest, most protective option, the work will be planned and executed in accordance with the applicable IWCP work packages. In addition, prior to execution of the planned activity, the Building 707 Closure Project POC and DOE POC will conduct special project status meetings as necessary to address stakeholder concerns and provide a detailed description of the activity, methods to be used, and scheduled date(s).

### 4.5.3.7 ES&H Controls and Monitoring

Demolition activities present hazards to workers and the environment. Table 14 summarizes the hazards and controls associated with each of the demolition techniques described in this section. Environmental impacts will be minimized using procedures designed to prevent uncontrolled release of waste, to control water run-on and run-off, and to minimize fugitive particulate emissions. The environmental protection procedures will be detailed in the Demolition Plan.

#### 4.5.3.7.1 Air Emissions Control

In accordance with CAQCC, Regulation 1, the demolition contractor will prepare a Dust Control Plan prior to initiation demolition activities. The Dust Control Plan will describe the specific methods that will be used to control fugitive particulates during demolition activities. As appropriate for the each activity, the following methods will be used to suppress fugitive emissions:

- A controlled water spray will be used to minimize fugitive particulate emissions without resulting in excess ponding or run-off. Depending on the facility location, a water truck or hydrant will be used. A flag or wind sock will be used to assist workers in maintaining the optimal location while directing the water spray.

# Table 14. Demolition Hazards & Controls

| Demolition Technique | Associated Hazards | Hazard Controls | Comments |
|---|---|---|---|
| Wrecking ball | Bodily injury due to flying/falling objects; hearing impairment; eye hazard. | Training on job-specific hazards, related procedures, PPE, and the proper use of equipment.<br>Inspection of equipment prior to use.<br>Implementation of Dust Control Plan. | Air monitoring will be performed in accordance with the Site IMP. |
| Excavator mounted attachments | Bodily injury due to flying/falling objects; hearing impairment; eye hazard. | Training on job-specific hazards, related procedures, PPE, and the proper use of equipment.<br>Inspection of equipment prior to use.<br>Implementation of Dust Control Plan. | Air monitoring will be performed in accordance with the Site IMP. |
| Diamond wire cutting | Bodily injury due to flying objects if wire breaks; hearing impairment; eye hazard. | Training on job-specific hazards, related procedures, PPE, and the proper use of equipment.<br>Inspection of equipment prior to use.<br>Implementation of Dust Control Plan. | Air monitoring will be performed in accordance with the Site IMP. |
| Cabling | Bodily injury; hearing impairment; eye hazard. | Training on job-specific hazards, related procedures, PPE, and the proper use of equipment.<br>Inspection of equipment prior to use.<br>Implementation of Dust Control Plan. | Air monitoring will be performed in accordance with the Site IMP. |
| Non-explosive cracking agents | Bodily injury, eye hazard (i.e., drilling required to create holes into which cracking agent is introduced). | Training on job-specific hazards, related procedures, PPE, and the proper use of equipment.<br>Inspection of equipment prior to use.<br>Implementation of Dust Control Plan. | Air monitoring will be performed in accordance with the Site IMP. |
| Explosives | Bodily injury, eye hazard. | Training on job-specific hazards, related procedures, PPE, and the proper use of equipment.<br>Inspection of equipment prior to use.<br>Implementation of Dust Control Plan. | Air monitoring will be performed in accordance with the Site IMP. |

- Facility debris will be loaded into waste roll-off containers that will be covered to control fugitive particulate emissions.
- Roads will be periodically sprayed and/or cleaned with a street sweeper.
- Dust control devices or shrouds will be used on individual pieces of equipment.
- Fixatives will be applied to concrete stockpiles to minimize dust.
- Demolition activities will be suspended by the Site's Shift Superintendent during periods of high wind (typically 30 mph [sustained]).
- In addition, the existing Site Radioactive Ambient Air Monitoring Program (RAAMP) sampler network will be used for ambient air monitoring during demolition. The RAAMP sampler network continuously monitors airborne dispersion of radioactive materials from the Site into the surrounding environment. Thirty-seven samplers comprise the RAAMP network. Fourteen of these samplers are deployed at the Site perimeter and are used to confirm Site compliance with the 10 mrem standard mandated in 40 CFR 61, Subpart H.
- Filters from the 14 perimeter RAAMP samplers and from one on-Site sampler near the 903 Pad are collected and analyzed monthly for uranium, plutonium, and americium isotopes. In addition to the perimeter network, enhanced radionuclide ambient air sampling will be performed on an as-needed basis utilizing RAAMP samplers in the immediate vicinities of the individual demolition projects. The emissions results from all facility demolition activities will be compiled and submitted annually for incorporation into the Radionuclide Air Emissions Annual Report.

#### *4.5.3.7.2 Air Monitoring*

Air monitoring will be performed in accordance with the requirements of the Site IMP. The existing RFETS Radioactive Ambient Air Monitoring Program (RAAMP) sampler network will be used for ambient air monitoring during removal activities. The RAAMP sampler network continuously monitors airborne dispersion of radioactive materials from the Site into the surrounding environment. Thirty-seven samplers comprise the RAAMP network. Fourteen of these samplers are deployed at the Site perimeter and are used to confirm Site compliance with the 10 mrem dose standard mandated in 40 CFR 61, Subpart H. Filters from the 14 perimeter RAAMP samplers and from one on-Site sampler near the 903 Pad are collected and analyzed monthly for uranium, plutonium, and americium isotopes. In addition to the perimeter network, enhanced ambient air sampling will be performed on an as-needed basis using RAAMP samplers in the immediate vicinity of the individual removal activities. Based on job hazards identified during the IWCP planning process, suspension limits will be established to stop work, evaluate monitoring results, and modify controls, as necessary. Results will be compiled and submitted annually for incorporation into the Radionuclide Air Emissions Annual Report.

#### *4.5.3.7.3 Soil Disturbance Permit*

Prior to the demolition of any building within the Building 707 Closure Project, the demolition contractor will complete a Soil Disturbance Evaluation Form, which will identify the location of underground utilities (i.e., sewer, process waste, storm drain, telephone, water, fuel, and electric lines), as well as any known environmental, waste, radiological, and/or safety hazards. When completed, the Soil Disturbance Evaluation Form will be reviewed by a Site excavation specialist, who will coordinate the review and

approval of the demolition work with the appropriate organizations. Soil disturbance activities will not be performed until the excavation specialist has provided written approval for the work to proceed.[44]

#### 4.5.3.7.4 Demolition Permit

Prior to the demolition of any building within the Building 707 Closure Project, the demolition contractor will prepare and submit a Demolition Notification to CDPHE for review and approval in accordance with CAQCC Regulation No. 8, Part B. Demolition activities will not be performed until CDPHE has provided written approval for the work to proceed.

#### 4.5.3.7.5 Migratory Bird Clearance

Prior to the demolition of any building within the Building 707 Closure Project, a survey will be conducted by an ecology SME to ensure the planned demolition activities will not impact migratory birds or their nests. This inspection is for nesting birds in and around facilities prepared for demolition.

#### 4.5.3.7.6 Surface Water Management

During facility demolition, surface water will be controlled using standard construction methods, including silt fences, hay bales, and diversion ditches (see Appendix B for details). Water from dust control and/or cutting activities will be managed as incidental waters in accordance with the RFETS procedure for the control and disposition of incidental waters.[45] Surface water monitoring will be conducted in accordance with Site Water Management Plan[46] and the Site IMP. Additional performance monitoring stations will be installed, as necessary, based on activity-specific assessments performed by Site water quality SME.

#### 4.5.3.7.7 Groundwater Management

The Sampling and Analysis Plan (SAP) for Decontamination & Decommissioning Groundwater Monitoring of Buildings 371/374, 707, and 776/777[47] describes the well installation, well development, and initial groundwater sampling activities planned for the Building 707 Closure Project during decommissioning. The general philosophy of the decommissioning Groundwater Monitoring Program is to install new monitoring wells before decommissioning activities begin, analyze sample results to create a pre-decommissioning baseline, and continue to draw samples semi-annually for approximately five years after the buildings within the Building 707 Closure Project have been demolished. Additional groundwater samples will be collected over the long term, in accordance with the Site IMP.

The levels of contamination in groundwater surrounding and beneath the footprint of the Building 707 Closure Project vary significantly among the buildings. The principal region of higher levels of groundwater contamination in this area is known as the "Industrial Area Plume."[48] The Industrial Area Plume is believed to result from contamination migrating from IHSS numbers 117.1, 117.2, 157.1, 158,

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[44] Soil disturbance requirements are contained in Chapter 45 of the RFETS Occupational Safety & Industrial Hygiene Program Manual, entitled "Excavation and Trenching."

[45] Control and Disposition of Incidental Waters (1-C91-EPR-SW.01), (latest revision).

[46] Rocky Flats Environmental Technology Site Water Management Program Plan (MAN-080-EM-SWMP), (latest revision).

[47] Sampling and Analysis Plan (SAP) for D&D Groundwater Monitoring of Buildings 371/374, 707 and 776/777 (latest revision).

[48] Integrated Monitoring Plan Background Document, FY 2000, September 1999; and the 1999 Annual RFCA Groundwater Monitoring Report, Figure 8-1, Monitoring Well Locations, East Industrial Area VOC Plume.

160, 171, and 182. Its principal constituents are three volatile organic compounds (VOCs): trichloroethene, tetrachloroethene, and carbon tetrachloride.

Four monitoring wells have been installed upgradient, and one has been installed downgradient of Building 707, with two additional downgradient wells planned for the near future. Preliminary sample results from the existing wells show concentrations of tetrachloroethene in one of the upgradient wells (100 µg/l) and in the downgradient well (5 µg/l), suggesting that the Industrial Area Plume extends to these locations. Nitrates and radiological contamination do not appear to be significant along the groundwater flow path. These pre-existing conditions will be factored into future evaluations of water quality impacts in the vicinity of the Building 707 Closure Project.

Detailed analysis of groundwater flow patters in the vicinity of Building 707 is prohibited due to a lack of sufficient well control near the building. However, available data indicate a broad, northeast trending area of relatively flat groundwater gradient dominates the flow field in this area.

In the event groundwater is encountered during facility demolition, it will be removed, as necessary to characterize and remediate the interior surfaces of the building, specifically the basement, vaults, sumps and/or pits. ER personnel will collect samples to characterize the groundwater. If the groundwater is contaminated, ER personnel will determine if the groundwater could impact surface water. If the water is contaminated, but there is no threat to surface water protection standards, the groundwater will be left in the subsurface structure with appropriate controls to protect the health and safety of workers and the public until remediation during ER. If the water is contaminated and is a threat to surface water protection standards, the water will be pumped to a treatment facility until remediated during ER. Table 15 provides some potential scenarios with respect to groundwater and surface water actions during decommissioning. This table presents examples of potential conditions and actions to be taken. Project-specific controls will be detailed in the Demolition Plan and IWCP work package for the demolition activity. ER actions and requirements will be detailed in the ER RSOP.

#### *4.5.3.7.8 Soil Characterization and Management:*

The IHSSs, Potential Areas of Concern (PACs), and Under Building Contamination (UBC) sites associated with buildings within the Building 707 Closure Project were considered in the Building 707 RLCR and are described in detail in the RFETS Historical Release Report (HRR).[49] IHSSs include 118.2, 150.4, and 150.7, which are clustered north of Building 707 and surrounding Building 778; 123.2, located west of Building 707; and 162, located between Buildings 778 and 732, and also under Buildings 711 and 711A. There are a number of other IHSSs recommended for No Further Action (NFA), (i.e., 162, 192, 194, 185, and 150.5). PACs are 700-1115, 700-1103, and 700-1101, associated with Buildings 708; the Building 707 roof; and Building 732, respectively. UBC sites have been identified for Buildings 707, 778, and 731. The complete characterization of these areas will occur during Industrial Area sampling activities, which will be performed in accordance with the Industrial Area Sampling and Analysis Plan (IA SAP), (when approved).

[49] Annual Update for the RFETS Historical Release Report (HRR), September, 2000, Appendix 4, Plates 1-4.

# Table 15. Groundwater and Surface Water Conditions & Associated Actions

| Condition | Action |
|---|---|
| Groundwater, surface water, utility water and/or precipitation is collecting in the excavation area or in below-ground structures (e.g., the basement, or in "C" Pit) and it must be removed to (1) ensure safe work areas and protection of the environment, and/or (2) characterize and remediate interior building surfaces. | As required, temporarily manage as "incidental waters" or "internal waste streams" during decommissioning activities. |
| Prior to decommissioning activities, water is collecting in sumps, vaults, or other below ground structures and pumped to Site treatment facilities. | This water will continue to be collected and treated in on-Site facilities as required to protect surface water and to maintain appropriate work environments until decommissioning is completed. |
| Prior to decommissioning activities, water is collecting in sumps, vaults, or other below ground structures but is not pumped or treated. | Water will not be collected, removed, or treated during decommissioning unless required to protect workers and/or surface water quality. However, water thus accumulated will be removed, characterized, and/or treated prior to completion of decommissioning activities. |
| There are potential future surface water impacts where decommissioning activities are conducted in areas or in ways that allow contact with surface waters. | Pathways to surface water from decommissioning activities will be monitored by the Environmental Media Management Group, as required by the Site IMP. |

## 4.6 Interfaces with Environmental Restoration

Decommissioning activities performed within the scope of this DOP will be coordinated with activities performed within the scope of the ER RSOP or other ER decision document to achieve an integrated process that minimizes risk to workers and the environment, minimizes the generation of remediation wastes, streamlines technical processes, and reduces Building 707 Closure Project costs. Project interface points will be as follows:

- Generally, the ER schedule will be integrated with the decommissioning schedule to allow for the planning and initiation of ER characterization activities during facility decommissioning.
- Demolition and ER activities will proceed as an uninterrupted two-phase operation culminating in closeout of the associated IHSSs, PACs, and UBC sites.
- During decommissioning:
  - Electrical and water lines will be removed. Underground utility lines located outside the facility footprint will be left in a stable condition. A map showing the locations and sources of these utility lines will be maintained in the Building 707 Closure Project files and provided to the ER Program.
  - Process waste lines, tanks, and other lines associated with the process waste transfer system (i.e., the "new" process waste lines) and any "old" process waste lines will be removed and/or isolated at the facility perimeter. A map, showing the locations and sources of the process waste lines will be maintained in the Building 707 Closure Project Files and provided to the ER Program.

- Sanitary sewer lines, tanks, and ancillary equipment will be flushed with clean water and removed to the nearest isolation valve.
- Structural material within three feet of the proposed final grade will be removed, including building slabs and foundations, unless otherwise required due to ER remediation requirements.
- Structures below three feet of the proposed final grade will be removed when the structure prevents access to contaminated soil, or when the structure does not meet the applicable unrestricted release criteria (see Table 4). Removal activities will include removal of the foundation and at least three feet of the associated footings/pilings. Any remaining footings/pilings will be assessed and removed (if required) during ER.

- During ER:
  - Sidewalks, driveways, and roads outside the facility footprint will be removed.
  - Process waste lines located beneath floor slabs will be removed, along with associated contaminated soil.
  - If necessary, underground utility lines located outside the facility footprint will be removed.
  - Structures remaining after removal to below three feet of the proposed final grade will be addressed (i.e., they will be left in place if uncontaminated; removed if contaminated).
  - The effects of remaining subsurface structures (e.g., utility and pipeline corridors, building slabs, foundations, drains) will be evaluated and reported in the Site Water Balance Study.
  - The Industrial Area Plume will be evaluated and remediated.
  - "White spaces" (i.e., areas without contamination) will be sampled and remediated, as necessary, when monitoring data indicate contamination was spread during remediation of adjacent areas.

In the event there is a gap between decommissioning and remediation activities, the RISS Project will be responsible for surveillance and maintenance activities associated with the building slab. The hand-off from decommissioning to the landlord organization will be documented in writing, by the Decommissioning Project, RISS Project, and ER Program.

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# 5.0 WASTE MANAGEMENT

Various waste types will be generated as a result of decommissioning activities within the Building 707 Closure Project. Waste estimates for these and other RFETS Closure Project activities are reported in the "Waste Generation, Inventory, and Shipping Forecast," which includes projections for waste volumes to be generated, stored, and shipped from the Site in each fiscal year. As the Project progresses, waste volume estimates will be refined and updated on a quarterly basis, or more frequently if warranted by significant changes. This section of the DOP describes how the various wastes will be managed as facility components are removed, size-reduced, and decontaminated in preparation for the demolition phase of decommissioning.

## 5.1 Process Waste Versus Remediation Waste

Wastes generated as a result of facility decommissioning will be accumulated, staged, stored, and treated in compliance with applicable laws, regulations, and requirements. When determining the appropriate waste management requirements, an important distinction exists between wastes designated as "process" waste and those designated as "remediation" waste.

Process waste in includes:

- Mixed residues;
- Liquids, sludges, and oils in tanks and ancillary equipment;
- Containerized waste generated prior to approval of this DOP; and
- Liquid waste chemicals (no matter when generated).

Remediation waste includes:

- Waste generated from decommissioning activities performed under this DOP,
- Solid waste chemicals (no matter when generated),
- Residual liquids or sludges remaining in "RCRA stable" or "physically empty" tanks.

### 5.1.1 Management Requirements for Process Waste

Hazardous and mixed wastes designated as "process" waste will continue to be managed in compliance with both the substantive and administrative requirements of RCRA, CHWA, CHWR, and the Site's RCRA Part B Permit.

### 5.1.2 Management Requirements for Remediation Waste

Hazardous and mixed wastes designated as "remediation" waste will be managed in accordance with the ARARs presented in Section 8.0 of this DOP, and with the remediation waste management requirements described in a Building 707 Operations Order, which will be prepared prior to the initiation of decommissioning activities.

# 5.2 Waste Types

As discussed in Section 3.0 of this DOP, facilities within the Building 707 Closure Project were designed and constructed in the early 1970s to replace the manufacturing processes originally performed in Building 776/777, including casting, forming, metallurgy, machining, assembly, inspection and non-destructive testing of plutonium parts, and associated support services. As a result, a variety of regulated wastes and recyclable materials are currently managed and stored in Building 707, and additional waste will be generated during decommissioning. Table 16 provides an estimate of the types and volumes of remediation waste and recyclable materials that will be generated during decommissioning. The remainder of the section provides a brief description of each waste type.

## 5.2.1 Hazardous Waste

Hazardous waste contains hazardous constituents or exhibits hazardous characteristics as defined by RCRA, CHWA, and the Colorado Hazardous Waste Regulations (CHWR). A variety of hazardous wastes may be generated during decommissioning, including metals, organics, combustibles, and hazardous liquids. Hazardous waste is routinely shipped to off-Site commercial facilities for treatment, and/or disposal.

## 5.2.2 Radioactive Waste

Radioactive wastes have been generated as a result of operations in areas where radioactive materials are or were formerly managed. A variety of radioactive waste forms are expected from facility component removal, size reduction, and decontamination activities, including metals, organics, combustibles, and liquids. Radioactive waste is categorized as transuranic (TRU) or low-level (LL), depending on the concentration of alpha-emitting radionuclides present in the waste.

### *5.2.2.1 Transuranic Waste*

TRU waste is defined as any waste contaminated with alpha-emitting transuranic radionuclides with half-lives greater than 20 years, in concentrations greater than or equal to 100 nanocuries per gram (nCi/g). TRU wastes will be generated during the removal of gloveboxes and B-boxes used in the fabrication, testing, assembly, coating, and disassembly of weapons components, and during the removal of Zone 1 ventilation/filtration systems.

Although most building tank systems will be drained during deactivation, some TRU waste liquids may be generated when residual liquids are removed from equipment, tanks, and ancillary piping during decommissioning. Liquid TRU waste will require treatment prior to disposal. TRU waste is destined for disposal at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, NM.

### *5.2.2.2 Low-Level Waste*

LL waste is defined as any radioactive waste not classified as TRU waste, high level waste, or spent nuclear fuel. The concentration of alpha-emitting radionuclides in LL waste is less than 100 nCi/g, with no specified minimum level of activity. LL waste forms expected from facility component removal, size reduction, and decontamination activities include debris, combustibles, light metals, and liquids. LL waste is routinely shipped to the Nevada Test Site (NTS) for disposal.

# Table 16. Waste/Recyclable Material Estimates

| Category | Sub-Category | Volume[a] | Proposed Destination |
|---|---|---|---|
| **Rad-Regulated** | | | |
| Transuranic (TRU) | TRU | 1,045 $m^3$ | Waste Isolation Pilot Plan (WIPP) |
| | TRU mixed (TRM) | 199 $m^3$ | WIPP |
| | Residues | 2 $m^3$ | WIPP |
| | TRU/TRM liquids | < 1 $m^3$ | NA |
| Low-Level (LL) | LL - Including asbestos and beryllium | 2,028 $m^3$ | TSD[b] |
| | LL - Structural debris | 2,291 $m^3$ | TSD[b] |
| | LL - Surface Contaminated Objects (SCO) | 9,987 $m^3$ | TSD[b] |
| | LL - Contaminated recycle metal | <1 $m^3$ | NA |
| | LL - Liquids | <1 $m^3$ | NA |
| | LL - PCBs | 1 $m^3$ | TSD[b] |
| Low-Level Mixed (LLM) | LLM - RCRA solids | 81 $m^3$ | TSD[b, c] |
| | LLM - RCRA liquids | 2 $m^3$ | TSD[b, c] |
| **Non-Rad Regulated** | | | |
| Hazardous/Toxic | RCRA | 4 $m^3$ | TSD[b] |
| | CERCLA | <1 $m^3$ | TSD[b] |
| | PCBs | 7 $m^3$ | TSD[b] |
| | Friable asbestos | 12 $m^3$ | TSD[b] |
| | RCRA/CERCLA liquids | <1 $m^3$ | TSD[b] |
| Sanitary | Routine sanitary | <1 ton | Sanitary landfill |
| | Non-routine sanitary | 6,058 tons | Sanitary landfill |
| | Rubble/structural construction debris | <1 ton | NA |
| | Non-friable asbestos | 23 tons | Sanitary landfill |
| Material for Recycle | Salvage/PU&D | <1 $m^3$ | Vendor |
| | Rubble/structural construction debris | 55,201 tons | Recycled on Site |
| | Radiolological test/calibration sources | <1 $m^3$ | NA |
| | Non-construction scrap metal/recycle | <1 $m^3$ | NA |

[a] Waste estimates are based on best available information. This table is for information purposes only and will not be revised as estimates are updated. Waste estimates include demolished structures.

[b] The RFETS Environmental Home Page (http://rfetshp/environmental/) contains a list of currently authorized waste management facilities. Off-Site waste management facilities are selected by the contractor based on periodic environmental audits, which are conducted in accordance with the Off-Site Waste Management Program (1-MAN-037-OWMP, latest revision) and documented in Off-Site Waste Management Facility Use Decisions (FUDs).

[c] Assumed to include on-Site treatment facilities (e.g., RCRA Unit 374.3).

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### 5.2.3 Mixed Waste

Mixed waste contains both radioactive and hazardous constituents. These wastes will be managed in accordance with the applicable radioactive waste and hazardous waste requirements.

#### *5.2.3.1 Transuranic Mixed Waste*

TRM waste is TRU waste with a hazardous waste constituent or characteristic. TRM waste types are the same as described above in Section 5.2.2.1 for TRU waste. TRM waste is destined for disposal at WIPP. TRM liquids (i.e., sludges and oils) will require treatment prior to shipment.

#### *5.2.3.2 Low-Level Mixed Waste*

LLM waste is LL waste with a hazardous waste constituent or characteristic. LLM waste types are the same as described above for LL waste in Section 5.2.2.2. Solid LLM waste is planned for disposal at Envirocare or other off-Site TSD facility. LLM wastewater may be transferred to Building 374 or other on-Site treatment unit, as described in Section 5.2.8. LLM process and remediation wastes that do not have a current treatment and/or disposal path will be managed under the Site Treatment Plan (STP).[50] STP wastes may include sludges from waste tanks, equipment oils, waste chemicals, and solids (e.g., lead shielding, leaded glass, printed circuit boards). As treatment paths and associated timetables are identified for these wastes, they will be identified period updates to the STP.

### 5.2.4 Waste Containing Polychlorinated Biphenyls

Polychlorinated biphenyls (PCBs) may be found in equipment oils, fluorescent light ballasts, applied dried paints, plastics (e.g., wire insulation; radio, television, and computer casings; vehicle parts, and furniture laminates), pre-formed or molded rubber parts, and capacitors.

Equipment oils containing PCBs will be managed as "PCB liquids"; solid waste containing PCBs (e.g., light ballasts, applied dry paints) will be managed as "PCB bulk product waste"; and capacitors containing PCBs will be managed as "PCB items." PCB waste will be packaged and transferred to on-Site storage pending shipment to an off-Site treatment and/or disposal facility.

### 5.2.5 Sanitary Waste

Sanitary waste is classified as routine (e.g., normal office trash), (2) non-routine (e.g., construction debris), and (3) special (e.g., petroleum-contaminated media). Sanitary waste is collected for recycle or disposal at an off-Site landfill, such as the Front Range Landfill, Inc. in Erie, Colorado. Special sanitary waste is identified to the Sanitary Waste Program for specific requirements on a case-by-case basis.

### 5.2.6 Waste Containing Beryllium

Beryllium-contaminated waste may be generated during facility component removal, size reduction, and decontamination activities. Equipment and other waste items, as defined by 10 CFR 850.31(a), that are removed from beryllium work areas will be managed as beryllium waste. Building structural material and equipment and items from non-beryllium work areas not regulated under 10 CFR 850.31 may be released as non-beryllium-contaminated sanitary waste or recycled (if the waste is not RCRA listed or characteristic waste) and if beryllium concentrations are < 0.2 μg/100 $cm^2$ based on surface swipes or process knowledge. Characterization of facility components (e.g., building structural material,

[50] Section 3021(b) of RCRA (42 USC 6901 *et seq.*), as amended by the Federal Facility Compliance Act (FFCAct) of 1992 (42 USC 6961), required DOE to prepare a Site Treatment Plan describing the development of treatment capacities and technologies for LLM wastes.



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equipment, and other items) is addressed in the DDCP and PDSP. Components determined to be beryllium waste will be placed in sealed containers, labeled as beryllium waste, and disposed at a contractor-approved disposal facility. Beryllium-contaminated waste may be free of radioactive or hazardous contaminants (i.e., special sanitary waste), or it may be radioactive and/or hazardous (i.e., it could also be LL, LLM, TRU, TRM, or hazardous waste).

### 5.2.7 Asbestos-Containing Material

ACM in the form of pipe and equipment insulation, mastic, and floor and ceiling tiles was used extensively in buildings across the Site. ACM will be removed and packaged for disposal at an off-Site TSD facility. Non-radioactive, non-hazardous ACM is defined as special sanitary waste. Some ACM may also be contaminated with radioactivity and/or hazardous components (i.e., it could also be LL, LLM, TRU, TRM, or hazardous waste). Disposal options for ACM will vary depending on other contaminants present in the waste.

### 5.2.8 Wastewater

Consistent with provisions of the RFCA Implementation Guidance Document (IGD)[51], wastewater generated during decommissioning will be collected and characterized to determine the appropriate management option (e.g., on-Site treatment and/or storage pending off-Site treatment and/or disposal). During this time, either of two process waste tanks in Building 731[52] and/or a tank in Building 732[53] may be used as flow-through devices for RCRA-regulated liquids and non-RCRA-regulated liquids collected for transfer to Building 374 for treatment. As flow-through devices, these tank systems will not be used to accumulate liquids for extended periods of time. Prior to use, appropriate tank management requirements (e.g., waste residence time, inspection, overfill prevention, leak detection, closure requirements) will be identified and implemented in consultation with the LRA.

### 5.2.9 Building Rubble & Structural Construction Debris

Building demolition activities will result in the generation of large quantities of concrete rubble, reinforcing steel, roofing, and miscellaneous materials meeting the applicable unrestricted release criteria (see Table 4). The majority of this material will be concrete, cinder block, or other similar debris that will be suitable for use as fill material to contour the land when decommissioning is complete.

The staging, monitoring, and disposition of building rubble and structural construction debris generated during facility demolition will be consistent with the requirements of the RSOP for Recycling Concrete. Demolition debris will be sorted at the Building 707 slab or adjacent area, and the debris that is suitable for recycling will be piled in the staging area designated for the PA. The location currently envisioned for concrete storage is the in the area currently occupied by Solar Pond 207-C. The rubble pile will be sprayed with a surfactant and monitored for fugitive dust. Silt fences will be added to retain water. Any run-off from the pile will be collected if it accumulates, and analyzed in accordance with the applicable Site procedures.

[51] Rocky Flats Cleanup Agreement (RFCA), Appendix 3, RFCA Implementation Guidance Document (latest version).

[52] Former RCRA 90-day tanks #731-651 and 731-652.

[53] Interim Status Unit 40.16.

# 5.3 Management Requirements for Compliance Order Wastes

The Site's inventories of idle equipment containing hazardous materials, mixed residues contained in tank systems, and certain mixed wastes for which there is no current disposal pathway, are governed by the terms and conditions of compliance orders on consent.

## 5.3.1 Idle Equipment Containing Hazardous Materials Inventory

Idle equipment containing hazardous materials is managed under the Idle Equipment and Hazardous Waste Tank Compliance Order on Consent.[54] Table 17 contains a list of the currently-identified equipment in Building 707. Some of this equipment may be dispositioned during deactivation and additional pieces of equipment may be identified during deactivation and decommissioning. An up-to-date list will be maintained in the Building 707 Closure Project Files. All idle equipment containing hazardous materials, both existing and newly identified, will be managed as follows:

- Idle equipment designated as Category 1, 2, or 3 equipment will be posted with a sign or tag stating the following: *This idle equipment contains material that, if released, could affect worker safety or the environment. Report any spillage to supervision immediately.*
- Idle equipment will be subject to the following inspection schedule:
  - Hazard Category 1: Monthly
  - Hazard Category 2: Bi-monthly
  - Hazard Category 3 & 4: No inspections required
- Inspections will be conducted by RCRA-qualified waste inspectors, who will ensure the equipment is posted, in good condition, and not leaking. Inspectors will document their inspections in an inspection log, noting any required corrective measures.
- Hazardous waste contained in idle equipment will be drained or removed to the point of being empty. For surfaces of the equipment that are visible and readily accessible, the affected surfaces (i.e., surfaces that may have come into contact with hazardous waste) will be cleaned or wiped visually clean (i.e., no oily surface or sheen) to satisfy the RCRA definition of a "clean debris surface."[55] In the event the clean debris surface standard cannot be met, the equipment will be cleaned or wiped down to remove as much removable contamination as reasonably possible, with the objective of eliminating significant risk from the remaining residuals.
- The hazardous waste will be characterized in accordance with 6 CCR 1007-3, Part 262.11. Sampling methods, if used, will comply with those listed in Appendix I of 6 CCR 1007-3, Part 261. Analytical test methods, if used, will comply with those instructions contained in either EPA Manual SW-846 or RFETS "L-Procedures."
- When empty, the equipment will be characterized and managed in accordance with the applicable ARARs.

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[54] Idle Equipment and Hazardous Waste Tanks Compliance Order on Consent (97-08-21-01), including the RFETS Idle Equipment Management Plan, 01/28/00.

[55] A "clean debris surface" is defined as "a surface that, when viewed without magnification, is free of all visible contaminated soil or hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided such staining and soil and waste in cracks, crevices, and pits is limited to no more than 5 percent of each square inch of surface area." (6 CCR 1007-3, Section 268.45)

# Table 17. Building 707 Idle Equipment with Hazardous Materials Inventory

| Location | Idle Equipment Number | Set# | Description | Material | Hazard Category | Rad-Contaminated ? | Quantity |
|---|---|---|---|---|---|---|---|
| Outside | 707-0002 | NA | Carbon tetrachloride Tank #26150 and associated ancillary equipment | Carbon tetrachloride | 3 | No | Dry residue |
| Module A, Rm. 100 | 707-0024 | 1 | Lodge & Shipley Lathe | Coolant oil, carbon tetrachloride | 3 | Yes | ½" |
| Module C, Rm. 110, GB-C105 | 707-0035 | 3 | Harding Lathe | Coolant oil, carbon tetrachloride | 3 | Yes | 1/16" to 1/8" |
| Module C, Rm. 110, GB-C115 | 707-0036 | 3 | Lodge & Shipley Lathe | Coolant oil, carbon tetrachloride | 3 | Yes | > 2" |
| Module C, Rm. 110, GB-C125 | 707-0037 | 3 | Chucker Lathe | Coolant oil, carbon tetrachloride | 3 | Yes | ½" |
| Module C, Rm. 110, GB-C25A | 707-0039 | 3 | Heald T-Base Lathe | Coolant oil, carbon tetrachloride | 3 | Yes | ¼" |
| Module C, Rm. 110, GB-C25B | 707-0040 | 3 | Heald T-Base Lathe | Coolant oil, carbon tetrachloride | 3 | Yes | ¼" |
| Module C, Rm. 110, GB-C45A | 707-042A | 3 | Heald T-Base Lathe | Coolant oil, carbon tetrachloride | 3 | Yes | 2" |
| Module C, Rm. 110, GB-C45B | 707-0043 | 3 | Heald T-Base Lathe | Coolant oil, carbon tetrachloride | 3 | Yes | 2" |
| Module C, Rm. 110, GB-C65A | 707-0044 | 3 | Heald T-Base Lathe | Coolant oil, carbon tetrachloride | 3 | Yes | 1/2" |
| Module C, Rm. 110, GB-C65B | 707-0045 | 3 | Heald T-Base Lathe | Coolant oil, carbon tetrachloride | 3 | Yes | 1/2" |
| Module B, Rm. 105, GB-B105 | 707-0067 | 2 | Rolling Mill | Coolant oil, carbon tetrachloride | 3 | Yes | 10 gallons |
| Module B, Rm. 105, GB-B20 | 707-0068 | 2 | Lodge & Shipley Lathe | Coolant oil, carbon tetrachloride | 3 | Yes | <10 gallons |
| Module C, Rm. 110, GB-C60 | 707-0071 | 3 | Heald T-Base Lathe | Coolant oil, carbon tetrachloride | 3 | Yes | 10 gallons |

### 5.3.2 Mixed Residues

Building 707 has an existing inventory of residues and residues mixed with hazardous waste, which are being treated and/or repackaged in preparation for shipment to WIPP. Residues are plutonium-contaminated liquids and solids that were once held in reserve at RFETS, because they contain plutonium in sufficient quantities to warrant treatment for recovery of nuclear material. The mixed residue tank units located within the Building 707 Closure Project are listed in Table 18.

The existing inventory of liquid mixed residues contained in tanks and ancillary equipment has been managed under the terms and conditions of the Mixed Residue Compliance Order on Consent.[56] As part of facility deactivation, these tanks were tapped and drained in 1998. The tanks are currently in a physically empty configuration and are inspected quarterly. In the event additional inventory is discovered in a tank during decommissioning, Building 707 Facility management will develop an action plan to determine the source of the liquid, or schedule a sampling event or other appropriate action to make a hazardous waste determination. If appropriate, the action plan may include draining the liquid from the system. The Building 707 Closure Project Health and Safety Plan (HASP) contains pre-planning requirements for responses to possible releases from mixed residue tank systems. Pre-planning activities include identification of vital elements of the tank system, identification of locations of primary shut-off valves capable of isolating feed to a tank, and a pre-release plan, which specifies the recommended method to drain the tank system (e.g., hot tapping at a low spot, draining into bottles, or draining into another tank system). Facility operations personnel are trained to implement the pre-release plan and accompanying shut-off procedures. In the event of an actual release from a mixed residue tank system, the Site's RCRA Contingency Plan will be followed.

In accordance with paragraph 66(i) of the Mixed Residue Compliance Order on Consent, the order is hereby terminated as to each of the mixed residue tanks located in Building 707.

### 5.3.3 Site Treatment Plan Wastes

The Compliance Order Requiring Compliance with the Site Treatment Plan (STP)[57] governs the management of certain mixed wastes for which there is no current treatment or disposal path. These wastes include LLM wastes with actinide activity levels between 10 and 100 nCi/g, and wastes containing hazardous constituents that are prohibited from land disposal under RCRA and the CHWA (i.e., land disposal restricted [LDR] wastes. The STP describes the development of treatment capacities and technologies for these wastes. Progress is tracked through the Annual Progress Report and Work Plan, and Quarterly Progress Update reports, which are submitted for review and approval by CDPHE. STP wastes are tracked on a Site-wide basis, by waste form. The current inventory of STP wastes includes combustibles, acids, lab solutions, filters, glass and ground glass, inorganic sludges, insulation, and salt brine.

## 5.4 Waste Treatment

Remediation waste generated during decommissioning may be treated in the Site's existing RCRA-permitted treatment units; under the generator treatment provisions of 6 CCR 1007-3, Part 264.1(g)(6); under the debris rule standard identified in the 6 CCR 1007-3, Part 258.45; or in temporary units (TUs) established under the substantive requirements of 6 CCR 1007-3, Part 264.553.

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[56] Mixed Residue Compliance Order on Consent (99-09-24-01), including the Mixed Residue Tank Plan.

[57] The Compliance Order Requiring Compliance with the Site Treatment Plan (95-10-03-01) was issued pursuant to the CHWA and RCRA, as amended by the Federal Facility Compliance Act, which required the development and submittal of a Site Treatment Plan for each facility at which DOE generates or stores mixed wastes.

# Table 18. Building 707 Mixed Residue Tank Units

| RCRA Unit | Rm. | Set | Description | Associated EPA Waste Codes | Proposed Closure |
|---|---|---|---|---|---|
| 92.001 | C-Pit | 3 | Tank V-100 | F001, F002 | Physically Empty => Removal |
| 92.002 | C-Pit | 3 | Tank V-30 | F001, F002 | Physically Empty => Removal |
| 92.003 | C-Pit | 3 | Tank V-31 | F001, F002 | Physically Empty => Removal |
| 92.004 | C-Pit | 3 | Tank V-1 | F001, F002 | Physically Empty => Removal |
| 92.005 | C-Pit | 3 | Tank V-12 | F001, F002 | Physically Empty => Removal |
| 92.006 | C-Pit | 3 | Tank V-13 | F001, F002 | Physically Empty => Removal |
| 92.007 | C-Pit | 3 | Tank V-14 | F001, F002 | Physically Empty => Removal |
| 92.008 | C-Pit | 3 | Tank V-15 | F001, F002 | Physically Empty => Removal |
| 92.009 | C-Pit | 3 | Tank V-16 | F001, F002 | Physically Empty => Removal |
| 92.010 | C-Pit | 3 | Tank V-17 | F001, F002 | Physically Empty => Removal |
| 92.011 | C-Pit | 3 | Tank V-18 | F001, F002 | Physically Empty => Removal |
| 92.012 | C-Pit | 3 | Tank V-19 | F001, F002 | Physically Empty => Removal |
| 92.013 | C-Pit | 3 | Tank V-2 | F001, F002 | Physically Empty => Removal |
| 92.014 | C-Pit | 3 | Tank V-3 | F001, F002 | Physically Empty => Removal |
| 92.015 | C-Pit | 3 | Tank V-4 | F001, F002 | Physically Empty => Removal |
| 92.016 | C-Pit | 3 | Tank V-5 | F001, F002 | Physically Empty => Removal |
| 92.017 | C-Pit | 3 | Tank V-6 | F001, F002 | Physically Empty => Removal |
| 92.018 | C-Pit | 3 | Tank V-7 | F001, F002 | Physically Empty => Removal |
| 92.019 | C-Pit | 3 | Tank V-8 | F001, F002 | Physically Empty => Removal |

## 5.5 Waste Disposal

Wastes generated as a result of facility decommissioning activities will be packaged and characterized in compliance with RFETS waste management procedures[58], which implement TSD WAC and DOT packaging requirements. TSDs are selected by the contractor based on periodic environmental audits of facilities offering the required waste management services (i.e., treatment and disposal). Audits are performed in accordance with the requirements of the Off-Site Waste Management Program[59] and results are documented in Off-Site Waste Management Facility Use Decisions (FUDs).

## 5.6 Waste Minimization and Recycling

Waste minimization and recycling will be integrated into the planning and management of the remediation waste generated during decommissioning. Unnecessary generation of sanitary, hazardous, LL/LLM, TRU/TRM, and TSCA waste will be controlled using work techniques that prevent the

[58] See the Building 707 Waste Stream and Residue Identification & Characterization (WSRIC), (latest revision); Waste Characterization, Generation, and Packaging (PRO-079-WGI-001), (latest revision); Solid Radioactive Waste Packaging (4-D99-WO-1100), (latest revision); and Non-Radioactive Waste Packaging (PRO-301-WP-1027/NONRAD), (latest revision).

[59] Off-Site Waste Management Program (1-MAN-037-OWMP), (latest revision).

contamination of areas and equipment; preventing unnecessary packaging, tools, and equipment from entering radiological contaminated areas; and reusing contaminated tools and equipment when practical.

Standard decontamination operations and processes will be evaluated for waste minimization potential and suitable minimization techniques will be implemented. Property with radiological contamination or property containing hazardous materials may be reused or recycled on Site, off Site by other DOE facilities, or by publicly or privately owned facilities having proper authorization to take possession of the property. Materials generated during decommissioning will be recycled based on availability of appropriate recycle technologies, availability of approved recycle facilities, and cost effectiveness. Table 19 describes the recycling options that will be considered for the Building 707 Closure Project.

# Table 19. Material Recycling Options

| Material | Recycle Option | Comments |
|---|---|---|
| "Clean" scrap metal (not radioactively contaminated and not considered hazardous in accordance with RCRA) | Recycle through approved scrap metal vendors or via contract. | Material must meet receiving facility's WAC and licensing requirements, if any. |
| Radioactively contaminated scrap metal | Recycle by means of metal melt process vendors or contract. | Material must not exceed contamination types and levels identified in the receiving facility's WAC and licensing requirements, if any.[60] |
| Radioactive mixed scrap material (i.e., radioactively contaminated scrap metal mixed with hazardous constituents) | None | Currently trying to locate and approve facilities that can manage this type of material. |
| Non-radioactive scrap metal contaminated with beryllium | Decontaminate and recycle through approved commercial facility. | Post-decontamination concentrations will be <0.2 µg/100 $cm^2$. |
| Clean building rubble | Reuse on Site as backfill. | Must meet release criteria established in the RSOP for Recycling Concrete. |
| Clean wiring and other electrical components. | Recycle through approved commercial recycling facility. | Material must not exceed contamination types and levels identified in the receiving facility's WAC and license. |
| Clean bulk plastics and glass | Recycle through approved commercial recycling facility. | Material must not exceed contamination types and levels identified in the receiving facility's WAC and license. |
| Used lead acid batteries | Recycle through approved commercial recycling facility. | Material must meet receiving facility's WAC and licensing requirements, if any. |
| Used oil | Recycle through approved commercial fuel blending facility. | Material must meet receiving facility's WAC and licensing requirements, if any. |

[60] On January 12, 2000, the Secretary of Energy placed a moratorium on DOE's unrestricted release of scrap metals for recycling, pending a decision by the Nuclear Regulatory Commission (NRC). This was followed by a memorandum to DOE department heads on July 13, 2000, directing further action in four areas: (1) improvement of DOE's release criteria and monitoring practices; (2) expansion of efforts to promote reuse and recycling within the DOE Complex; (3) improvement of DOE's management of information concerning material inventories and releases; and (4) accelerated recovery of sealed sources. In addition, the Secretary suspended the unrestricted release for recycling of scrap metals from radiation areas within DOE facilities.

# 6.0 CLOSURE OF RCRA-REGULATED UNITS

The RCRA-regulated units located within the Building 707 Closure Project are listed in Table 20 and associated unit-specific closure information is provided in Appendix C. These units will be closed in compliance with the closure performance standards described in this section. All units will be closed prior to facility demolition. The LRA will be provided with timely notification of RCRA closure activities.

All RCRA-regulated units or portions of RCRA-regulated units located within the building will be closed prior to facility demolition. Portions of units located beneath the building slab or outside the building footprint (e.g., the valve vaults and underground piping associated with the Building 374 process waste system) will be taken to a RCRA stable configuration during decommissioning and closed in accordance with the ER RSOP.

## 6.1 Closure Options

Closure may be conducted in two stages: first by rendering a unit or portion of a unit "RCRA stable" if it is a permitted or interim status unit, [61] or "physically empty" if it is a mixed residue unit[62], then by completing the activities associated with the closure options described below. The RCRA closure process flow is depicted in Figure 13.

### 6.1.1 Clean Closure

RCRA-regulated units may be "clean closed" by documenting the absence of contamination or by decontaminating the unit.

**Clean Closure Option #1**: For units having a complete, detailed operating history, clean closure will be demonstrated when the LRA agrees the following criteria have been met:

- A review of the RCRA Operating Record indicates hazardous or mixed waste was never spilled in the unit, or complete documentation exists to demonstrate releases were adequately cleaned up (i.e., if a spill did occur, visible residual liquids and solid wastes were removed and the spill area was decontaminated), and
- A visual inspection of the unit and associated ancillary equipment notes the absence of hazardous or mixed waste stains and/or residuals.

[61] "RCRA stable" is the first step toward closure of permitted or interim status units, whereby wastes are removed from the unit and the possibility of future waste input is eliminated. For tank systems, this means a tank and its ancillary equipment have been drained to the maximum extent possible using readily available means, with the objective of achieving less than one percent holdup, and with no significant sludge and no significant risk remaining. Physical means, such as lock out/tag out or blank flanges, must then be used to ensure no waste is introduced to the system is defined in Part X.E of the RFETS RCRA Part B Permit and Closure Plan for Interim Status Units.

[62] "Physically empty" is the "RCRA stable" counterpart for mixed residue tanks. "Physically empty" is defined in the Mixed Residue Tank Plan as the condition of a tank or ancillary equipment in which no liquid remains after verification from personnel who are familiar with the tank system or by a proven technology (e.g., by draining at low points or by non-destructive testing).

# Table 20. Building 707 RCRA-Regulated Units

| Set # | Unit # | Bldg. | Unit Description | Regulatory Status | EPA Waste Codes |
|---|---|---|---|---|---|
| 1-10 and 12 | 707.1 | 707 | Container Storage | PERMITTED | D001-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001-F003, F005-F007, F009, U227 |
| 1, 2, 3, 4, 5 and 7 | 92.001 to 92.019 | 707 | Mixed Residue Tanks (Module C Pit):<br>Tank V-100, V-30, V-31, V-1, V-12, V-13, V-14, V-15, V-16, V-17, V-18, V-19, V-2, V-3, V-4, V-5, V-6, V-7, V-8 | RCRA STABLE (and also physically empty) per 99-DOE-03494 (1/28/99); approved by CDPHE 8/23/99; currently subject to quarterly inspections | F001, F002 |
| 1 | 707.1 | 707 | Container Storage, Module A, Gloveboxes A-25, A-30 (90.106), A-35, A-45, and A-55 | PERMITTED | D001-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001-F003, F005-F007, F009, U227 |
| 1 | 707.3A | 707 | Salt Stabilization Process: Module A, Gloveboxes A-70, A-75, A-80, A-85, A-90, A-100, A-120, A-125 (90.106), and Furnaces | PERMITTED but never activated; never used to treat hazardous waste. | NA |
| 1 | 90.59 | 707 | Container Storage, C-Cell, Module A | No longer subject to RCRA regulation; closed in accordance with "RCRA Closure Plan for Mixed Residue Container Storage Units," (11/22/98); closure certification signed 5/20/96 (ref. 96-DOE-07053, 5/28/96) | NA |
| 3 | 90.146 | 707 | Container Storage, Glovebox C-40, Module C | Never used for hazardous waste; not subject to RCRA regulation; withdrawn 10/26/94 (ref. 94-DOE-10453) | NA |
| 4 | 707.3C | 707 | Dry Residues Repackaging Process: Module D, Gloveboxes D-30, D-35, D-40, D-45, D-75, D-90, D-95, and Crusher, Saws, Milling Machine, and Hand Tools | PERMITTED but never activated; never used to treat hazardous waste | NA |

# Table 20. Building 707 RCRA-Regulated Units

| Set # | Unit # | Bldg. | Unit Description | Regulatory Status | EPA Waste Codes |
|---|---|---|---|---|---|
| 5 | 707.1 | 707 | Container Storage, Module E, Gloveboxes E-30, E-55 and E-115 | PERMITTED | D001-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001-F003, F005-F007, F009, U227 |
| 5 | 707.3B | 707 | Ash Stabilization Process: Module E, Gloveboxes E-20, E-25, E-30, E-55, E-60, E-65, E-70, E-95, E-105, E-110, E-115, E-125, hammer mill, sieves, and furnaces | PERMITTED | D004-011, F001, F002, F005-F007, F009 |
| 7 | 90.105 | 707 | Container Storage, Rm. 130B | Never used for hazardous waste; not subject to RCRA regulation; withdrawn 10/26/94 (ref. 94-DOE-10453) | NA |
| 8 | 90.75 | 707 | Container Storage, Rm. 136 (H-Vault) | Never used for hazardous waste; not subject to RCRA regulation; withdrawn 10/26/94 (ref. 94-DOE-10453) | NA |
| 8 | 90.76 | 707 | Container Storage, Module H, (H-Cage) | Never used for hazardous waste; not subject to RCRA regulation; withdrawn 10/26/94 (ref. 94-DOE-10453) | NA |
| 9 | 707.1 | 707 | Container Storage, Module J, Gloveboxes J-35 and J-55 | PERMITTED | D001-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001-F003, F005-F007, F009, U227 |
| 9 | 90.74 | 707 | Container Storage, Rm. 141 (J-Vault) | Mixed Residue unit; not in active use, but not RCRA stable | TBD |
| 9 | 90.98 | 707 | Container Storage, Rm. 142 (J-Closet) | Never used for hazardous waste; not subject to RCRA regulation; withdrawn 10/26/94 (ref. 94-DOE-10453) | NA |
| 9 | 92.020 | 707 | Plutonium Stabilization Unit, Glovebox 25, Module J | Never used for hazardous waste; not subject to RCRA regulation | NA |
| 9 | 92.021 | 707 | Plutonium Stabilization Unit, Glovebox 60, Module J | Never used for hazardous waste; not subject to RCRA regulation | NA |

# Table 20. Building 707 RCRA-Regulated Units

| Set # | Unit # | Bldg. | Unit Description | Regulatory Status | EPA Waste Codes |
|---|---|---|---|---|---|
| 10 | 90.147 | 707 | Container Storage, Glovebox K-45, Module K | Never used for hazardous waste; not subject to RCRA regulation; withdrawn 10/26/93 (ref. 94-DOE-10453) | NA |
| 10 | 707.1 | 707 | Container Storage, Module K, Gloveboxes K-65 and K-75 | PERMITTED | D001-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001-F003, F005-F007, F009, U227 |
| 12 | 92 series | 707 | Overhead piping associated with the Module C Pit Mixed Residue Tanks | PERMITTED | F001, F002 |
| 12 | 90.27 | 707 | Container Storage, C&D Halls | Never used for hazardous waste; not subject to RCRA regulation; Withdrawn 10/26/94 (ref. 94-DOE-10453). | NA |
| 12 | 90.28 | 707 | Container Storage, E&F Halls | No longer subject to RCRA regulation; closed in accordance with "RCRA Closure Plan for Mixed Residue Container Storage Units," (11/22/98); closure certification signed 5/26/96 (ref. 96-DOE-07053, 5/28/96) | NA |
| 12 | 90.60 | 707 | Container Storage, G&H Halls | No longer subject to RCRA regulation; closed in accordance with "RCRA Closure Plan for Mixed Residue Container Storage Units," (11/22/98); closure certification signed 5/26/96 (ref. 96-DOE-07053, 5/28/96). | NA |
| 17 | 40.16 | 732 | Laundry Waste Tank T-4 | INTERIM STATUS | F001-F003, F005, F007-F009 |

Figure 13. Closure Process Flow for RCRA-Regulated Units

**Clean Closure Option #2**: Units to be "clean closed" by chemical decontamination will be flushed and washed with a suitable decontamination solution to remove visible waste residuals and contaminants of concern, then rinsed with clean water. The final rinsate will be tested to determine whether:

- The pH of the rinsate is between 6 and 9, and
- The concentrations of priority pollutants (identified as having been managed in the unit) and heavy metals are below the Tier II action levels for ground water, as defined in Attachment 5 of RFCA. Rinsate meeting the Tier II groundwater action levels for listed waste constituents associated with the unit and the LDR standards for characteristic waste (as required for disposal) will be deemed to be "no longer contained in" and will be managed as non-hazardous waste.

The final rinsate will not exceed a volume of two gallons per 100 $ft^2$ of surface area rinsed, and for internal surfaces, such as tank systems, the final rinsate will not exceed a volume of 5 percent of the capacity of the system. If test results indicate the standard has been met, the unit will be considered "clean closed." Units that cannot be decontaminated to meet the performance standard will be removed prior to building demolition and managed as hazardous or mixed waste.

Decontamination residuals (i.e., the rinsate and equipment used to decontaminate the unit) will be characterized and disposed of in accordance with the applicable regulations.

**Clean Closure Option #3**: A third "clean closure" option will be available for floors and/or foundations within RCRA-regulated units that have been scabbled, hydrolased, or decontaminated using another abrasive technique. This option will be used when a floor and/or foundation will be left in place after facility demolition.

Following decontamination using an abrasive technique, floors and/or foundation surfaces meeting the following criteria will be considered "clean closed":

- A visual inspection of the unit and associated ancillary equipment confirms the absence of hazardous or mixed waste stains and/or residuals; and
- Radiological surveys verify surfaces are at or below the unrestricted release criteria listed in Table 4.

Areas not meeting the visual inspection criteria will be removed as hazardous or mixed debris. Residuals will be collected, characterized, packaged, and disposed in accordance with the applicable waste management procedures and requirements (see Section 5.0).

### 6.1.2 Unit Removal in Conjunction with "Debris Rule" Treatment

Alternatively, RCRA-regulated units may be closed by removal and treatment under the "debris rule." The "debris rule" applies to unit equipment or structures that have no intended use or reuse, and are slated for removal and discard. To meet the "debris rule" standard, decontamination will be conducted using the "abrasive blasting" physical extraction technology, or other appropriate technology identified in Part 268.45 of 6 CCR 1007-3 (Table 1, Alternative Treatment Standards for Hazardous Debris).

For example, tanks and gloveboxes containing hazardous constituents and high levels of radiological contamination may be decontaminated by chemical extraction, using a solution of cerium (IV) and nitric acid (i.e., cerium nitrate). Cerium (IV) is a powerful oxidizing agent that, when applied to radioactively contaminated stainless steel surfaces, serves to decontaminate the surfaces to significantly lower levels and, in some instances, to unrestricted release levels. The cerium (IV) is combined with .5 to 7 molar nitric acid to remove several microns of the stainless steel surface, thus releasing and dissolving



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embedded plutonium, uranium, and americium, as well as surface scale. The resulting surface has the appearance of new stainless steel. After applying the cerium wash, the waste liquid will be collected and treated with ferrous sulfate to reduce the cerium (IV) to cerium (III). As a side benefit, this process also reduces chromium (IV) to chromium (III).

The cerium nitrate will be introduced, (i.e., "fogged") into a contaminated tank or glovebox through a prefabricated port that has been secured to the tank or glovebox. A spray header (i.e., the cerium nitrate delivery system) will then be affixed to the prefabricated port and the cerium nitrate will be applied to the internal surfaces of the tank or glovebox. In addition, the tank or glovebox may be fogged with water to rinse residual acid from the equipment. The resulting aqueous waste stream will then be transferred to the caustic waste treatment system in Building 374, or other approved treatment facility, for final processing. Since the cerium nitrate and water will be fogged into the tank or glovebox system, very little liquid waste will be generated. The spray header will then be removed and the tank or glovebox will be inspected to confirm the absence of hazardous or mixed waste stains. As a final step, the equipment will be sealed, pending final disposition as non-hazardous debris.

If, after "debris rule" treatment, the equipment or structure meets the standard for a "clean debris surface,"[63] and it does not exhibit a hazardous waste characteristic, it will no longer be considered a hazardous waste and will be managed as a solid waste. In the event the standard is not met, the equipment or structure will be removed and managed as hazardous or mixed waste. Treatment residuals, including rinsates generated from extraction and/or destruction technologies used in the closure of RCRA-regulated units, will be characterized in compliance with 6 CCR 1007-3, Part 262.11, and managed accordingly.

### 6.1.3 Unit Removal without On-Site Treatment

RCRA units that are not decontaminated to meet the "clean closure by decontamination" standard will be removed, size-reduced, if necessary, and packaged to meet the waste acceptance criteria (WAC) of the approved disposal facility. In the event this waste cannot be shipped directly to a disposal facility, it will be stored in compliance with the remediation waste management requirements identified in individual Building Operations Orders and with the ARARs identified in Appendix D.

## 6.2 Closure Documentation

For units undergoing clean closure in accordance with Section 6.1.1 of this DOP, a closure certification will be prepared and signed by an independent, Colorado registered, professional engineer. The closure certification will be submitted to the LRA for review and concurrence within 60 days after completion of the associated closure activities. Units removed in accordance with Sections 6.1.2 and 6.1.3 will not require a professional engineer's certification.

In addition, RCRA unit closure activities will be documented in the Building 707 Closure Project AR File and referenced in the PDSR, which will be completed prior to building demolition. Upon final closure of each RCRA-regulated unit, the Site's Master List of RCRA Units will be updated to reflect the new closure status of the unit and the unit will be removed from the RCRA Part A and Part B Permits in accordance with the applicable hazardous waste regulations.[64]

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[63] See footnote 55.

[64] Code of Colorado Regulations, 6 CCR 1007-3, Section 100.63, Permit Modification at the Request of the Permittee.

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# 7.0 ENVIRONMENTAL CONSEQUENCES

RFCA mandates incorporation of National Environmental Policy Act (NEPA) values into all RFCA decision documents. The following paragraphs summarize the results of the environmental impact analysis that was performed for the full scope of the Building 707 Closure Project, including building component removal, size reduction, decontamination, and demolition activities and removal of materials and waste from the Building 707 Closure Project, as well as the Project's contribution to the cumulative impacts of Site-wide closure activities and other major federal actions occurring within the vicinity of the Site.

## 7.1 Environmental Impact Issues

As described in earlier sections, the buildings that comprise the Building 707 Closure Project are located entirely within PA of the Site's Industrial Area. Initial investigations show that many interior surfaces, process drains, piping, gloveboxes, filters, sumps, and other equipment are radioactively contaminated.

The proposed closure activities for the Type 3 and Type 2 buildings include asbestos abatement; decontamination of interior surfaces and equipment by vacuuming and wiping; disconnection of electrical power; draining of piping systems and equipment; removal of gloveboxes and other equipment; further decontamination by wiping, washing, scabbling, and other methods; and dismantling and demolition of the buildings. Given the existing environment and industrial setting, environmental impact issues associated with the Building 707 Closure Project are relatively limited. The proposed activities should not result in discernible long-term adverse effects to biological resources, including vegetation, wetlands, wildlife habitat, or threatened and endangered species populations or their habitat. The buildings to be decommissioned are not located in a floodplain and the proposed activities will not affect or be affected by any floodplain. No wild and scenic rivers, prime agricultural soils, parks, or conservation areas will be affected. The proposed activities will provide employment for a limited number of people, most from the current Site work force. Thus, the activities are unlikely to result in adverse socioeconomic effects. As a result, the focus of this analysis is on the following additional areas:

- Mobilization of radioactive and other contaminants into soil, air, surface water, or ground water;
- The health and safety of workers who may be exposed to radioactive, toxic or hazardous materials or waste;
- The health and safety of the public, resulting from closure activities, including potential accidents; and
- This project's contribution to Site-wide or nearby cumulative impacts.

## 7.2 Impacts to Geology and Soils

Decommissioning activities in the Building 707 and associated facilities will disturb minor land acreage, most of which has been disturbed previously. There will be a short-term increase in soil erosion and siltation surrounding building drainage pathways. Volatile organic compounds and radionuclide contamination already exist in the Building 707 footprint and adjacent areas.



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## 7.3 Impacts to Air Quality

Potential impacts to air quality resulting from the Building 707 Closure Project include:

- Release of asbestos fibers from ACM removal activities,
- Release of beryllium and radionuclides from the decontamination and removal of equipment and building material,
- Release of hazardous air pollutants from the removal of waste oil collection and organic solvent tanks, and
- Fugitive particulate emissions from demolition and associated transportation activities.

Air emissions from these activities will be controlled and monitored in accordance with the Site OS&IH Program and air quality ARARs presented in Section 8.0 of this DOP. Controls used for individual decommissioning activities will be selected during the planning and engineering phase of the IWCP process and described in the associated IWCP work packages.

ACM is present in several areas, primarily in the form of pipe insulation. This material will be removed in accordance with applicable ARARs. There is minimal risk of an asbestos release to the atmosphere if the removal, transportation, and final disposition are conducted in accordance with the applicable ARARs because the ARARs are designed to prevent a release to the environment.

Decontamination, size reduction, removal, and ultimate disposal of equipment and materials in the Type 3 and Type 2 buildings have the potential to release radionuclides and residual chemical vapors to the air. As a result, decontamination and size reduction activities will take place within containment (e.g., tents) and the building HVAC systems will be configured and controlled to ensure that air flows from areas of least contamination (e.g., corridors, rooms) to areas of higher contamination (e.g., gloveboxes). Air streams will be filtered through various stages of high efficiency particulate air (HEPA) filters, which remove particulate contamination. System interlocks will be used to shut down air supply systems to prevent air reversals in the event of a loss of exhaust airflow. National Emission Standards for Hazardous Air Pollutants (NESHAPs), (40 CFR 61, Subpart H), requires air emissions monitoring for any release point having estimated uncontrolled radioactive air emissions in excess of 0.1 mrem/year effective dose equivalent (EDE) to any member of the public. As necessary, monitoring will be performed utilizing the existing effluent stack monitors, the existing Radioactive Ambient Air Monitoring Program (RAAMP) network, and/ or project-specific air monitoring methods described in the Site IMP.

## 7.4 Impacts to Water Quality

Potential impacts to surface water and stormwater run-off resulting from closure activities include the release of liquids via drains or doors that have direct access to the outdoor environment. However, such releases are unlikely because all work will be performed in accordance with the requirements of the Site's safety management programs. Decommissioning activities involving liquids will be identified to ensure drains and/or doorways are appropriately blocked.

Techniques under consideration for decontamination of the building equipment include the use of water or steam to remove radiological contamination and loose debris. If selected, these decontamination techniques will be used while the building shell and utility support systems are still intact. While these techniques are effective in removing radiological contamination, they may also generate large volumes of potentially contaminated water. Contaminated water will be sampled before release or transfer to Building 374 or other approved treatment facility.

In addition, fine water misting may be used to control fugitive particulate emissions during demolition activities. This water will be managed under the Site's Incidental Waters Program.

Because aboveground structures such as cargo containers will be removed, some new bare ground may be exposed to wind and water erosion, and surface water flow characteristics may be impacted. When appropriate, silt fencing, erosion control mats, or similar protective devices will be installed to prevent or minimize the possibility of water-borne soil leaving the immediate area and entering drainage ways.

## 7.5 Impacts to Human Health

Because the nature of decommissioning work is to remove or fix contamination in place, closure activities have the potential to expose involved workers, non-involved workers, and the public to radiological and other chemical contamination. Disturbance of contaminants increases the chance of the contaminants to be dislodged, become airborne, and be inhaled by or deposited on humans. Human health impacts will be controlled, mitigated, and monitored in accordance with the RFETS OS&IH Program.

## 7.6 Radiological Health Impacts

Radiological dose calculations for workers and the public are based on information contained in the Rocky Flats Cumulative Impacts Document (CID).[65] The CID radiological dose calculations are based on a 100,000 $ft^2$ generic plutonium processing facility representative of plutonium processing facilities at RFETS. At approximately 200,000 $ft^2$, Building 707 is about twice as large as generic facility. As a result, the dose rates to the workers and public in the CID have been proportionately increased to estimate worker and public health impacts for Building 707. No other adjustments are needed because the assumptions used for the CID calculations were similar to conditions for Building 707 (e.g., work crew sizes, activities, and schedules are similar in both cases).

For involved workers, closure activities are estimated to result in a total dose of 132 person-rem. This exposure is expected to result in less than one latent cancer fatality, assuming the same worker group of 24 people conducts both deactivation and decommissioning activities. This is a conservative estimate since work crews will be assigned so individual workers will be protected in accordance with the Site's 500 mrem control level. Doses to co-located workers from the Building 707 Closure Project alone have not been evaluated. However, the annual radiological exposure of a maximally exposed co-located (unprotected) worker as a result of Site-wide closure activities is estimated at 5.4 mrem. The corresponding risk of a latent cancer fatality to this worker is two in 1,000,000.

Annual dose to the maximally exposed off-Site individual from Site closure activities is estimated at 0.23 mrem, with a corresponding excess latent cancer fatality of 1 in 10,000,000. The annual dose to the public as a result of all activities performed as part of the Rocky Flats Closure Project at the peak time of exposure (1997 - 2006), is expected to be a total of 23 rem for the 2.7 million people projected to be living within 50 miles of the Site in 2006. This annual dose of 23 person-rem is expected to result in less than one (0.01) latent cancer fatality in the entire Denver area population. Estimated annual dose to the maximally exposed off-Site individual is well below the applicable standard of 10 mrem/year.

Estimated doses to the maximally exposed off-Site individual from the Building 707 Closure Project are expected to be a small fraction of the estimates for Site-wide activities, as described above. For comparison purposes, the DOE annual limit for occupational exposure as a result of all activities and through all exposure pathways is 5,000 mrem (5 rem) per person. Natural background radiation in the Denver area results in an annual exposure of approximately 350 mrem per person. Exposures to workers

[65] Rocky Flats Cumulative Impacts Document (CID), (latest revision).



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and the public will be controlled and monitored in accordance with the RFETS Radiation Protection Program.

## 7.7 Non-Radiological Health Impacts

Non-radiological health effects from exposure to chemicals are measured by a hazard index. A hazard index greater than one is considered to be a basis for concern, and the greater the index is above one, the greater the level of concern.

For the full suite of Site closure activities, including closure of all buildings, a hazard index of 1.2 has been calculated for a co-located worker who is chronically exposed during working hours to all chemicals of concern simultaneously over the entire period of Site closure. The corresponding cancer risk is five in 100,000. For the full suite of Site closure activities, including closure of all buildings, a hazard index of 1.5 has been calculated for a member of the public who is chronically exposed every day for 70 years to all chemicals of concern simultaneously (a highly unlikely event). A more reasonable scenario of exposure to a single chemical showed hazard indices of well below one for each potentially released chemical. Analysis of potentially carcinogenic air pollutants indicates a cancer risk of three in 10,000,000 for the maximally exposed off-Site individual.

Estimated non-radiological impacts from the Building 707 Closure Project are expected to be a fraction of those estimated for Site-wide activities, as described above. Exposures to workers and the public will be controlled and monitored in accordance with the RCRA Program and Chemical Life Cycle Program.

## 7.8 Occupational Hazards

In addition to exposure to radiological and chemical hazards, workers at the Site will be exposed to a variety of industrial hazards such as heavy machinery, repetitive motion tasks, and environmental stresses such as heat and cold. Using a general industry rate for construction to estimate injury and illness cases, Site closure activities are estimated to result in 584 cases of injury and illness during the peak activity period (1997 through 2006). The portion of these cases estimated to result from the Building 707 Closure Project alone would be less than the total Site figure.

The rate of injury and illness for the construction industry is considerably higher than the historic incidence rate for the Site. Occupational hazards will be controlled, mitigated, and monitored in accordance with the RFETS OS&IH Program.

## 7.9 Impacts to Plants and Animals

Because the Building 707 Closure Project is located in the previously disturbed Industrial Area, impacts to plants and animals are expected to be minimal. Increased vehicular and pedestrian traffic could result in the disturbance of some vegetation. Small mammals, such as rats, mice, rabbits and raccoons are known to be residents of or visitors to the Industrial Area. These mammals will be displaced, and some mortality will occur as a result of closure activities.

Each spring, migratory birds, such as barn swallows, build nests in building doorways and under building over-hangs within the Building 707 Closure Project. Migratory birds are protected by the Migratory Bird Treaty

Act, which prohibits the removal or destruction of bird nests without a permit from the U. S. Fish and Wildlife Service. As a result, during the early stages of project planning and scheduling, the Building 707 Closure Project Manager will work with the contractor's Ecology Group to take preventive measures to discourage nesting or to obtain the required nest removal permits.

# 7.10 Impacts Associated with Waste Management Activities

Environmental impacts associated with waste management are related to human health issues, storage capacities, and transportation. In general, waste generated from the Building 707 Closure Project will include contaminated and uncontaminated equipment, tools, electrical conduit systems, ventilation systems, piping systems, gloveboxes, and facility structural materials.

Items not radiologically contaminated, or those decontaminated to a free-release condition, may be transferred for use at a different location within RFETS, for use at a different DOE facility, or sent to the PU&D organization for appropriate handling. Items that cannot be decontaminated to a free-release condition will be managed as waste, or reused on Site or at another DOE facility in accordance with applicable release criteria. Mixed waste will be managed on Site in accordance with approved Site procedures until it can be shipped for off-Site disposal. Waste will be generated, characterized, stored, and disposed of in accordance with the requirements described in Section 6.0 of this DOP.

# 7.11 Impacts to Historic Resources

Potential impacts related to historical resources are the loss of Building 707 as an historic structure eligible for the National Register of Historic Places, and a secondary contributor to a potential Historic District comprised of Cold War Era facilities. Sixty-four buildings within the Site's Industrial Area, including Building 707, were identified by the State Historic Preservation Officer (SHPO) as important to the historic role of the Site in manufacturing nuclear weapons components during the Cold War.

The history of the Rocky Flats Plant, including Building 707, has recently been documented in the Historic American Engineering Record for the Rocky Flats Plant Historic District.[66] This documentation, consisting of a narrative report, engineering drawings, and photographs, meets the requirements of the programmatic agreement and has been accepted by all responsible parties. Since this documentation has been approved, it effectively mitigates any adverse impacts the Building 707 Closure Project may have on historic resources.

# 7.12 Impacts Associated with Elevated Noise Levels

The decommissioning of the Type 3 and Type 2 buildings within the Building 707 Closure Project is not expected to significantly increase noise levels in the Rocky Flats area. Most activities (e.g., size reduction, scabbling, abrasive blasting) will take place inside the associated buildings, so elevated noise levels will be confined to the structures in which they are generated. Workers involved in these activities will use appropriate hearing protection devices. Outdoor activities will take place at a distance from unprotected workers and the public, and are not expected to increase noise levels to an unsafe level.

# 7.13 Socioeconomic Impacts

The Building 707 Closure Project will contribute to a net overall loss of employment in the long run. The current on-Site work force in the building will either be drawn into the closure activities for the building (and potentially for the entire Site) or terminate employment. In the short run, closure activities may increase the employment level due to increased needs. Additionally, a modest increase of purchases (e.g., raw materials) may result.

Under the worst -case scenario, if the entire work force currently assigned to the Building 707 Closure Project elects to terminate employment, the overall impact will not have a significant adverse effect on

[66] Kaiser-Hill Company, L.L.C., Historic American Engineering Record for the Rocky Flats Plant (HAER-CO-83-T), 1999.

the Denver Metropolitan area, including Boulder and Jefferson Counties, where the majority of the work force resides. The net socioeconomic effects associated with the demolition of facilities within the Building 707 Closure Project are expected to be minimal.

# 7.14 Cumulative Impacts

The Building 707 Closure Project will contribute incrementally to potential Site-wide cumulative impacts associated with the overall Rocky Flats Closure Project. Cumulative impacts are impacts to the environment resulting from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions. Significant impacts could result from several smaller actions that, by themselves, may not have significant impacts. The cumulative effects of Site cleanup efforts are described in the CID. That document describes the short- and long-term effects from the overall Site clean-up mission. Cumulative impacts of the Building 707 Closure Project relative to the Site closure will include:

- Decommissioning activities associated with the Building 707 Closure Project will generate sanitary, hazardous, TSCA, LL, LLM, TRU, and TRM wastes. Existing on-Site interim storage for radioactive waste is limited and eventually, as Site-wide closure progresses, additional storage capacity may be needed.
- Increased traffic volume, resulting from off-Site shipments of plutonium components and waste, may cause congestion problems, an increase in traffic accidents resulting in fatalities, and an increase in potential latent cancer illnesses related to motor vehicle and fugitive particulate emissions.
- Adverse socioeconomic impacts from reductions in the Site's workforce will not substantially affect the surrounding region due to additional growth projected in the area.

Some cumulative impacts may ultimately be beneficial to the environment. Remediation is currently scheduled to follow facility demolition, which may result in the restoration of some of the Site to its original, natural condition:

- Removal of human occupation, structures, and paved surfaces, and re-establishing native grasses and other vegetation, could restore native plant communities and increase wildlife habitat, including threatened and endangered species.
- Removal of contamination will reduce health risks to human and animal populations.
- High-profile structures that have dominated the Site and the local skyline for 45 years will be eliminated. The landscape will take on a less industrial and more open, rural appearance, similar to the rangeland that characterized the area before buildings on the Site were constructed.

# 7.15 Mitigation Measures

Mitigation measures are designed to reduce or avoid potentially adverse effects associated with a proposed activity. For the decontamination and demolition of the Type 3 and Type 2 buildings within the 707 Closure Project, mitigation measures will be considered in the areas of human health, worker safety, release of emissions and mobilization of contaminants, and cultural resources.

Closure will be conducted in accordance with applicable Site programs; activities will be managed so that emissions and discharges are within applicable regulatory limits.



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Closure activities will take place within existing buildings or temporarily constructed facilities (e.g., tents) with functioning drainage, air filtration, and other safety and environmental protection systems commensurate with risks inherent in the activities being conducted.

Precautions will be taken to ensure compliance with the Migratory Bird Treaty Act, which prohibits destruction of birds or their nests, active or inactive, without a permit. Building demolition activities that would destroy nests will not be conducted during the nesting season, or measures will be taken to avoid affecting nesting birds prior to the nesting season. Activities that may affect nesting birds will be coordinated with Site ecologists. No closure activities will take place in or near the habitat of known threatened or endangered species.

## 7.16 Unavoidable Adverse Effects

As described in the preceding paragraphs, adverse effects will occur during the performance of specific closure activities, and effects will conclude when closure activities are complete. Activities will be planned and executed such that no effects exceed the applicable regulatory limits (see Sections 4.0 through 6.0). All environmental, safety, and health risks will be managed per industry practices, DOE policy, and Site programs (see Section 4.0).

## 7.17 Short-Term Uses Versus Long-Term Productivity

Unlike projects that commit a site to a particular use for a period of time, the effect of this closure project will be to undo commitments concerning use of the Site and open up a new and broad range of potential future uses. Closure does not commit the Site to a particular land use; rather, closure of the Type 3 and Type 2 buildings within the Building 707 Closure Project will mark one step in the process of ending one use and opening consideration for a variety of other possible future short- and long-term uses.

## 7.18 Irreversible and Irretrievable Commitments of Resources

Funds, labor, equipment, fuel, tools, personal protective equipment, waste storage drums, and similar items are resources that will be irretrievably committed to the Building 707 Closure Project. Some resources, such as uncontaminated materials, will be recovered.

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# 8.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Decommissioning activities conducted at RFETS must comply with the applicable or relevant and appropriate requirements (ARARs) under the Comprehensive Response Compensation and Liability Act (CERCLA). ARARs have been identified for the complete scope of decommissioning activities, including demolition, and they are listed in Appendix D.[67]

Pursuant to RFCA, actions taken under an approved RFCA decision document are exempted from the procedural requirement to obtain federal, state, or local permits. For activities performed within the scope of this DOP, certain hazardous and mixed waste management activities are exempted from permitting requirements of RCRA and CHWA, as discussed in Sections 4.0 and 5.0. The following paragraphs describe how the ARARs will be applied to decommissioning activities conducted as part of the Building 707 Closure Project to satisfy the RFCA permit waiver requirements.

## 8.1 Air

Closure activities have the potential to generate particulate, radionuclide, fugitive particulates, and hazardous air pollutant emissions. Subpart H of 40 CFR 61 contains the requirements for monitoring and reporting activities within DOE facilities that have the potential to emit radionuclides other than radon. Building 707 is subject to effluent monitoring of radionuclides due to holdup in ducts and gloveboxes.

Colorado Regulation No. 1 (5 CCR 1001-3) governs opacity and particulate emissions. Section II of Regulation No. 1 addresses opacity and prohibits stack emissions from fuel-fired equipment exceeding 20 percent opacity. Section III addresses the control of particulate emissions. Fugitive particulate emissions will be generated from demolition and transportation activities. During demolition activities, dust minimization techniques, such as water sprays, will be used to minimize suspension of particulates. In addition, demolition operations will not be conducted during periods of high wind.[68] The substantive requirements of Regulation No. 1 will be incorporated into a Dust Control Plan, which will define the level of air monitoring and particulate control for the project.

Colorado Regulation No. 3 (5 CCR 1001-3) provides CDPHE with the authority to inventory emissions and Part A describes Air Pollutant Emission Notice (APEN) requirements. If applicable, an APEN will be prepared by air quality management subject matter experts (SMEs) to facilitate CDPHE's inventory process.

## 8.2 Solid Waste

During decommissioning, hazardous and mixed wastes designated as "process" waste (i.e., mixed residues; liquids, sludges, and oils in tanks and ancillary equipment; containerized waste generated prior to approval of this DOP, and liquid waste chemicals, no matter when generated) will be managed in accordance with the substantive and administrative requirements of RCRA, CHWA, the Colorado Hazardous Waste Regulations (CHWR), and the Site's RCRA Part B Permit. Hazardous and mixed

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[67] Certain State of Colorado Radiation Control Regulations pertaining to decommissioning and environmental releases may be relevant and appropriate to building decommissioning and ER activities, particularly the cleanup of soils. The parties to RFCA are in the process of negotiating a final list. Appendix A will be modified, as appropriate, when the reach agreement on the final list.

[68] At RFETS, the high wind threshold is typically 30 mph (sustained), as prescribed by the Shift Superintendent.



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wastes designated as "remediation" waste will be managed in accordance with the substantive requirements of the applicable regulations (i.e., the waste management ARARs).

Non-radioactive, non-hazardous wastes will be managed in compliance with the substantive requirements of CDPHE's solid waste regulations (6 CCR 1007-2). If necessary, remediation waste may be treated in remediation waste treatment units established under the substantive requirements of 6 CCR 1007-3, Part 264.553. Incompatible waste, if encountered, will be segregated within the units. The need for secondary containment will be assessed and provided, as appropriate, when liquid waste is stored or treated in tanks or containers. Wastes will be characterized, as appropriate, in accordance with the substantive requirements of 6 CCR 1007-3, Part 261. Once tanks have been drained, berms providing secondary containment will be removed to facilitate equipment removal.

ACM will be managed in accordance with 5 CCR 1001-10, Regulation 8. Specifically, Section III, C.7.6, provides maximum allowable asbestos levels and Sections C.8.2(b), (d) and (f) provide requirements for handling asbestos waste materials.

Polychlorinated biphenyls (PCBs), including those that are radiologically contaminated, will be managed in accordance with the substantive requirements of 40 CFR Part 761.

## 8.3 Wastewater

Remediation wastewater will be managed consistent with provisions of the RFCA Implementation Guidance Document (IGD).[69] Remediation wastewater will be collected, characterized, and transferred to an approved treatment unit for processing (e.g., Building 374, the Site sewage treatment plant, or to another approved on-Site or off-Site treatment facility), or it will be directly discharged in accordance with the Site requirements for control and disposition of incidental waters. In addition, all connections to the sanitary sewer system will be identified and protected pursuant to 40 CFR 125, and all discharges of stormwater and treated wastewater into surface water bodies will meet the applicable substantive requirements.

## 8.4 Migratory Birds

Closure activities may impact migratory birds protected by the Migratory Bird Treaty Act[70], and the Fish and Wildlife Conservation Act.[71] Due to the variations in potential impacts depending upon the season and the nesting schedules for migratory birds, the substantive requirements of these federal statutes will be evaluated by ecology SMEs prior to conducting the actions associated with decommissioning. The substantive requirements identified during the evaluation will be implemented throughout decommissioning.

[69] RFCA Implementation Guidance Document (Appendix 3 to RFCA), (latest revision).

[70] Migratory Bird Treaty Act, 16 USC 701 *et seq.*

[71] Fish and Wildlife Conservation Act, 16 USC 661 *et seq.*

# 9.0 IMPLEMENTATION SCHEDULE

The recent Site-wide re-baselining effort has resulted in the development of a detailed schedule and basis of estimate for completion of the Building 707 Closure Project. A copy of this schedule is provided in Appendix A. The schedule is not an enforceable part of this DOP and DOE or its contractor may alter the schedule without prior notification to or approval by the LRA. Significant schedule changes will be shared with the LRA as part of the RFCA consultative process.

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# 10.0 RECORDS DISPOSITION

Building 707 Closure Project records consist of the CERCLA Administrative Record (AR) File, the RCRA Operating Record, the Closure Project Files, and the Decommissioning Final Closeout Report and associated documentation.

## 10.1 CERCLA Administrative Record File

This section identifies the documents that constitute the Administrative Record (AR) file for the Building 707 Closure Project. Upon completion of the public comment period, comments received from the public will be incorporated into this DOP. LRA approval of this DOP and associated major and minor modifications constitutes approval of the AR File.

The following documents comprise the Building 707 Closure Project AR File:

- Final Rocky Flats Cleanup Agreement (RFCA)
- RFETS Decommissioning Program Plan (DPP)
- RFETS Facility Disposition Program Manual (FDPM)
- RFETS Decontamination & Decommissioning Characterization Protocol (DDCP)
- RFETS Reconnaissance Level Characterization Plan (RLCP)
- Building 707 Closure Project Joint Scoping Meeting Minutes/Disposition
- Building 707 Closure Project Reconnaissance Level Characterization Report (RLCR) and related correspondence
- Draft Building 707 Closure Project DOP
- Final Building 707 Closure Project DOP and related correspondence
- RFETS Pre-Demolition Survey Plan (PDSP)
- Building 707 Closure Project Pre-Demolition Survey Report and related correspondence
- Building 707 Closure Project Decommissioning Final Closeout Report
- Building 707 Closure Project Demolition Permit(s)
- Notification to CDPHE prior to demolition (required for asbestos abatement activities)
- Air Pollutant Emission Notification (APEN), (required if 2000 lbs. dust/volatile organic compound (VOC) emissions will be exceeded in a single event)
- Building 707 Closure Project Decommissioning Final Closeout Report and associated correspondence
- All other documents referenced in this DOP



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The following information repositories have been established to provide public access to the Building 707 Closure Project AR File:

U.S. Environmental Protection Agency
(EPA)
Region VIII
Superfund Records Center
999 18th Street, Suite 500
Denver, Colorado 80202-2466
(303) 293-1807

Rocky Flats Citizens Advisory Board
(RFCAB)
9035 Wadsworth Parkway
Suite 2250
Westminster, Colorado 80021
(303) 420-7855

Colorado Department of Public Health and Environment (CDPHE)
Information Center, Building A
4300 Cherry Creek Drive South
Denver, Colorado 80220-1530
(303) 692-3312

U.S. Department of Energy Rocky Flats
Public Reading Room
Front Range Community College Library
3645 West 112th Avenue, Level B
Westminster, Colorado 80030
(303) 469-4435

## 10.2 RCRA Operating Record

RCRA records, including inspection records, will be maintained with the existing Building 707 RCRA Operating Record. Upon completion of the Building 707 Closure Project, the RCRA Operating Record will be transferred to Site Records Management for storage.

## 10.3 Closure Project Files

Project-specific documents will be stored in the Building 707 Closure Project Files until final closure is complete, at which time the Closure Project Files will be processed through Site Records Management and archived. The Closure Project Files will contain characterization documentation, inventory sheets, Project correspondence, comment resolution, IWCP work packages and other WCDs, and additional information that is a direct result of the work involved in the Project. Maintenance of the Closure Project Files is a Site requirement.

## 10.4 Decommissioning Final Closeout Report

Upon completion of decommissioning activities for the Building 707 Closure Project, a Decommissioning Final Closeout Report will be prepared in accordance with RFCA[72] and the DPP.[73] The Closeout Report will consist of a brief description of the work completed, including:

- Any modifications to the original DOP;
- Final sampling and analysis reports;
- A description of the quantity and characteristics of the wastes generated and how the wastes were stored or disposed; and

[72] RFCA Implementation Guidance Document (Appendix 3 to RFCA), (latest revision).

[73] DPP Section 3.3.11, Notifying Regulators of Completion of Decommissioning (latest revision).



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- A statement, if true, that the goals and objectives of the Project were met and if not, what additional work is required.

The expected outline for the Closeout Report is shown below. The format may change to meet the needs of the Project.

- Introduction
- Remedial action description
- Verification that remedial action goals were met
- Verification of treatment process (if applicable)
- Radiological analysis (if applicable)
- Waste stream disposition
- Site reclamation
- Deviations from the decision document
- Demarcation of where excavation took place
- Demarcation of wastes left in place
- Dates and durations of specific activities (approximate)
- Final disposition of wastes (actual or anticipated)

Upon completion, the Decommissioning Final Closeout Report will be submitted for review and concurrence by the LRA.

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# 11.0 COMMENT RESPONSIVENESS SUMMARY

Responses to comments received during the formal public comment period, including comments from the regulatory agencies, are documented in Appendix E. In addition, Appendix E describes a number of changes that have been made to reflect recent revisions in the RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities. These changes are necessary to ensure consistency between this DOP and the RSOP.

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# GLOSSARY OF TERMS

**Administrative Requirements**. Administrative requirements are those mechanisms that facilitate the implementation of the substantive requirements of a statute or regulation. Administrative requirements include the approval of administrative bodies, consultation, issuance of permits, documentation, reporting, recordkeeping, and enforcement. In general, administrative requirements prescribe methods and procedures by which substantive requirements are made effective for purposes of a particular environmental or public health program.

**Applicable or Relevant and Appropriate Requirements (ARARs)**. ARARs are promulgated standards, requirements, criteria or limitations that will be met during closure activities to ensure the protection of human health and the environment and to ensure proper management of waste. A requirement under environmental laws may be either "applicable" or "relevant and appropriate."

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Only those standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable. (40 CFR 300.5)

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not applicable to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a CERCLA site, their use is well suited to the particular site. Only those standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable. (40 CFR 300.5)

**Asbestos**. Asbestiform varieties of chrysolite, amosite (cummintonite-grunerite), crocidolite, anthophyllite, tremolite, and actinolite.

**Asbestos-Containing Material**. Material containing more than 1 percent friable asbestos.

**CERCLA**. The Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §9601 *et seq.*, as amended by the Superfund Amendments and Reauthorization Act of 1986, Pub. L. 99-499, and the Community Environmental Response Facilitation Act, Pub. L. No. 102-26; and the National Contingency Plan and other implementing regulations. (RFCA ¶25[m])

**Closure**. In the context of RCRA/CHWA hazardous waste management units, closure means actions taken by an owner or operator of a treatment, storage, or disposal unit to discontinue operation of the unit in accordance with the performance standards specified in 6 CCR 1007, §264.11 or §265.111, as appropriate. (RFCA ¶25[p])

**Deactivation**. The process of placing a building, a portion of a building or building component (as used in the rest of this paragraph "building") in a safe and stable condition to minimize the long-term cost of a surveillance and maintenance program in a manner that is protective of workers, the public, and the environment. Actions during deactivation could include the removal of fuel, draining and/or de-energizing of non-essential systems, removal of stored radioactive and hazardous materials, and related actions. As the bridge between operations and decommissioning, based upon Decommissioning Operations Plans (DOPs) or the Decommissioning Program Plan (DPP), deactivation can accomplish operations-like activities such as final process runs, and also decontamination activities aimed at placing the facility in a safe and stable condition. Deactivation does not include decontamination necessary for the dismantlement and demolition phase of decommissioning (i.e., removal of contamination remaining in fixed structures and equipment after deactivation). Deactivation does not include removal of contaminated systems or equipment except for the purpose of accountability of SNM and nuclear safety. It also

does not include removal of contamination except as incidental to other deactivation or for the purposes of accountability of SNM and nuclear safety. (RFCA ¶25 [y])

**Decommissioning**. Decommissioning means, for those buildings, portion of buildings or building components (as used in the rest of this paragraph, "building") in which deactivation occurs, all activities that occur after the deactivation. It includes surveillance, maintenance, component removal, decontamination and/or dismantlement and size reduction for the purpose of retiring the building from service with adequate regard for the health and safety of workers and the public and protection of the environment. For those buildings in which no deactivation occurs, the term includes characterization, surveillance, maintenance, component removal, decontamination and/or dismantlement and size reduction for the purpose of retiring the building from service with adequate regard for the health and safety of workers and the public and protection of the environment. The ultimate goal of decommissioning is unrestricted use or, if unrestricted use is not feasible, restricted use of the buildings. (RFCA ¶25[z])

**Decontamination**. The removal or reduction of radioactive or hazardous contamination from facilities, equipment, or soils by washing, heating, chemical or electrochemical action, mechanical cleaning or other techniques to achieve a stated objective or end condition. (RFCA ¶25[aa])

**Dismantlement**. The demolition and removal of any building or structure or a part thereof during decommissioning. (RFCA ¶25[ab])

**Facilities**. Buildings and other structures, their functional systems and equipment, and other fixed systems and equipment installed therein; outside plant, including site development features such as landscaping, roads, walks, and parking areas; outside lighting and communication systems; central utility plants; utilities supply and distribution systems; and other physical plant features.

**Facility Component**. For the purposes of this RSOP, the term "facility component" refers to gloveboxes, tanks and ancillary piping, fume hoods, ventilation/filtration systems, other utilities and equipment, as well as building walls, ceilings, floors, and structural members.

**Facility Disposition Process**. The sequence of activities required to take a facility from its existing condition to final disposition. The goal of disposition is for the Site to accomplish all of the activities necessary either to demolish the building and dispose of the resulting waste or to release the building for reuse.

As discussed in RFCA Attachment 9, unless building specific conditions otherwise warrant, the following activities are typical, but not all inclusive, of those that will be performed for a building: (a) containerized waste and materials removed; (b) Liquid waste and processing systems drained; (c) RCRA units closed or have a closure plan integrated with building disposition plan; (d) all TRUM, defined as materials in excess of 100 nCi per gram, removed; (e) equipment, piping, ducts, gloveboxes, and major electrical components removed (e.g., strip out), (f) radioactive hot spots and hazardous substances removed; and (g) easily removed contamination removed. (DPP, Section 2.1)

**Hazard**. A source of danger (i.e., material, energy source, or operation) with the potential to cause illness, injury, or death to personnel, or damage to a facility or the environment without regard for the likelihood or credibility of accident scenarios or consequence mitigation.

**Hazardous Waste**. Hazardous waste is any solid waste that either exhibits a hazardous characteristic (i.e., ignitability, corrosivity, reactivity, or toxicity) or is named on one of three lists published by the EPA in 40 CFR 261, Identification and Listing of Hazardous Waste. To be considered hazardous, a waste must first meet EPA's definition of "solid waste," which includes liquids.

**HVAC Systems**. Heating, ventilation and air conditions systems at RFETS, which provide the differential pressures and necessary filtration required to maintain confinement of radioactive materials.

**Independent Verification**. An independent verification is performed by and independent contractor that takes its own measurements and samples, and/or reviews the Site's results.

**Interim Measure**. The RCRA/CHWA term for a short-term action to respond to imminent threats, or other actions to abate or mitigate actual or potential releases of hazardous wastes or constituents.

**Interim Remedial Action**. The CERCLA term for an expedited response action performed in accordance with remedial action authorities to abate or mitigate an actual or potential threat to public health, welfare, or the environment from the release or threat of a hazardous substance from RFETS.

**Job Hazard Analysis**. An analysis of procedurally controlled activities that uses developed procedures as a guide to address and consider the hazards due to any exposures present during implementation of (job) procedures, the use and possible misuse of tools and other support equipment required by the procedures, and the behavioral motivations of the people performing them. A type of hazard analysis process, which breaks down a job or task into steps, examines each step to determine what hazard(s) exist or might occur, and establishes actions to eliminate or control the hazard.

**Low-Level (LL) Waste**. LL waste is any radioactive waste that is not classified as transuranic waste, high-level waste, or spent nuclear fuel. No minimum level of radioactivity has been specified for LL waste. LL waste mixed with hazardous waste is referred to as low-level mixed (LLM) waste.

**PCB Bulk Product Waste**. Waste derived from manufactured products containing PCBs in a non-liquid state, at any concentration where the concentration at the time of designation for disposal was >50 ppm PCBs. PCB bulk product waste excludes PCBs or PCB Items; but includes: 1) non-liquid bulk waste or debris from the demolition of buildings and other man-made structures; 2) PCB-containing waste from the shredding of automobiles, household appliances, or industrial appliances 3) plastics; preformed or molded rubber parts and components, applied dried paints, varnishes, waxes, or other similar coatings or sealants; caulking; adhesives; paper, Galbestos; sound-deadening or other types of insulation; and felt or fabric products such as gaskets; 4) fluorescent light ballasts containing PCBs in the potting material.

**PCB Item**. Any PCB Article, Article Container, PCB Container, or PCB Equipment, that deliberately or unintentionally contains, or has as a part of it, any PCB or PCBs. This category includes electrical equipment such as transformers, capacitors and switches.

**PCB Remediation Waste**. Waste containing PCBs as a result of a spill, release, or other unauthorized disposal, at the following concentrations: (1) materials disposed of prior to April 18, 1978, that are currently at concentrations $\geq$ 50 ppm PCBs, regardless of the concentration of the original spill; (2) materials which are currently at any volume or concentration where the original source was $\geq$ 500 ppm PCB beginning on April 18, 1978, or $\geq$ 50 ppm beginning on July 2, 1979; and (3) materials which are currently at any concentration if the PCBs are from a source not authorized for use under 40 CFR Part 761.

PCB remediation waste means soil, rags, and other debris generated as a result of any PCB spill cleanup, including, but not limited to the following: (1) environmental media containing PCBs, such as soil and gravel; dredged materials, such as sediments; settled sediment fines, and decanted aqueous liquid from sediment; (2) sewage sludge containing <50 ppm PCBs and not in use according to §760.20(a) [relating to uses of sewage sludge regulated under Parts 257, 258, and 503 of 40 CFR]; (3) PCB sewage sludge, commercial or industrial sludge contaminated as a result of a spill of PCBs including sludge located in or removed from any pollution control device, and decanted aqueous liquid from an industrial sludge; and (4) buildings and other man-made structures, such as concrete or wood floors or walls contaminated from a leaking PCB or PCB-contaminated transformer, porous surfaces and non-porous surfaces.

**Physically Empty**. The condition of a tank or ancillary equipment in which no liquid remains after verification by personnel who are familiar with the tank system or a by proven technology. For example, verification may be performed by draining at low points or by non-destructive testing.

**Process Waste**. Process waste is solid, hazardous, radioactive and/or mixed waste generated as a result of normal building operations and deactivation activities.

**Radiological Contamination**. Radioactive material present in a location where it should not be present.

**RCRA Stable**. A step toward RCRA closure, whereby wastes are removed from a RCRA-regulated unit and the possibility of future waste input is eliminated. For tank systems this means a tank and its ancillary equipment have been drained to the maximum extent possible using readily available means, with the objective of achieving less than one percent holdup, and with no significant sludge and no significant risk remaining. Physical means must then be used to ensure no waste is re-introduced to the system (e.g. lock out/tag out, blank flanges). (RCRA Part B Permit and Interim Status Closure Plan, Part X.E)

**Remediation Waste**. Remediation waste includes all solid, hazardous, radioactive, and/or mixed waste; all media and debris containing hazardous substances or listed hazardous or mixed wastes, or exhibiting a hazardous characteristic; and all hazardous substances generated from activities regulated under RFCA as RCRA corrective actions or CERCLA response actions, including decommissioning under an approved decision document. Remediation waste does not include waste generated from other activities (e.g., normal building operations and deactivation activities). (RFCA ¶25[bf])

**Resource Conservation and Recovery Act (RCRA)**. The Resource Conservation and Recovery Act, 42 U.S.C. §6901 *et seq.*, as amended by the Hazardous and Solid Waste Amendments of 1984, the Federal Facility Compliance Act of 1992, and implementing regulations. (RFCA ¶25[ay])

**Residues**. Plutonium-contaminated liquids and solids that were once held in reserve at Rocky Flats because they contain plutonium in sufficient quantities to warrant treatment for recovery of nuclear material. Residues mixed with hazardous waste are referred to as mixed residues.

**RFCA Standard Operating Protocol (RSOP)**. Approved protocol applicable to a set of routine environmental remediation and/or decommissioning activities regulated under RFCA that RFFO may repeat without re-obtaining approval after the initial approval because of the substantially similar nature of the work to be completed. Initial approval of an RSOP will be accomplished through an interim measure/interim remedial action process.

**Sanitary Waste**.

Routine Sanitary Waste. This type of sanitary waste is collected in dumpsters located throughout RFETS. Typically these wastes consist of soft or compactable items generated by office/administrative and cafeteria areas and do not required a Radiological Waste Release Evaluation prior to generation or disposal into dumpsters. Typical routine sanitary waste includes: packaging and general office refuse; food waste from cafeteria or offices; non-recyclable paper, cardboard and miscellaneous glass; metal rubber; and plastic items from routine office/administrative operations.

Special Sanitary Waste. Special sanitary waste is sanitary waste that requires specific treatment, analysis, certification, and/or packaging prior to disposal off Site. Special sanitary waste includes asbestos and beryllium waste that is not hazardous waste.

Set. Small, manageable groupings of similar systems, equipment, and areas or rooms that may be worked independently. Sets serve as the foundation for prioritizing and scheduling building component removal, size reduction, and decontamination activities within a building or cluster of buildings.

**Subject Matter Expert (SME)**. One who possesses specialized knowledge, skills, training , experience and/or abilities in a particular profession and is therefore considered an expert in the field (e.g., air quality, water quality, waste management, facility decommissioning).

**Substantive Requirements**. Substantive requirements are those requirements that pertain directly to actions or conditions in the environment. Examples include quantitative health- or risk-based restrictions upon exposure to

types of hazardous substances (e.g., maximum contaminant levels [MCLs] establishing drinking water standards for particular contaminants), technology-based requirements for actions taken upon hazardous substances (e.g., incinerator standards requiring particular destruction and removal efficiency), and restrictions upon activities in certain special locations (e.g., standards prohibiting certain types of facilities in a floodplain).

**To-Be-Considered (TBCs)**. TBCs are non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of potential ARARs. However, in many circumstances, TBCs will be considered with ARARs as part of the Site risk assessment and may be used in determining the necessary cleanup levels for protection of public health and the environment.

**Toxic Substances Control Act (TSCA)**. Toxic Substances Control Act, 15 USC 2601 *et seq.* and associated implementing regulations at 40 CFR 761.

**Transuranic (TRU) Waste**. TRU waste is any waste that is contaminated with alpha-emitting transuranium radionuclides with half-lives greater than 20 years, in concentrations greater than or equal to 100 nCi/gram at the time of assay. TRU waste mixed with hazardous waste is referred to as TRU mixed waste (TRM).

**Zone I and Zone I(A) Ventilation Area**. Primary enclosures, including any area in which the atmosphere is in direct contact with radioactive or other hazardous materials. Zone I enclosures are sealed enclosures (i.e., gloveboxes, chainveyors, and transfer boxes). Zone I(A) enclosures are Zone I enclosures with openings (i.e., hoods, B-boxes, and downdraft tables). Zone I ventilation areas must pass through a minimum of four independently testable stages of high efficiency particulate air (HEPA) filters prior to exhausting to the atmosphere.

**Zone II Ventilation Area**. Secondary enclosures, including any enclosed area (usually bounded by floor, ceiling, walls, and doors), which contain primary enclosures within their boundaries (e.g., Module A). Zone II areas have a possibility of being contaminated from primary enclosures. These areas require constant air monitoring using selective alpha air monitors (SAAMs) and air heads. The air from Zone II ventilation areas must pass through a minimum of two HEPA filters prior to exhausting to the atmosphere.

**Zone III Ventilation Area**. Tertiary enclosures, including those areas that surround or are adjacent to Zone II areas. Typically, these are corridors, cold shops, or office areas within the Contamination Area (CA). Zone III areas have no direct contact with Zone I enclosures and have only a very slight potential for becoming contaminated.

**Zone IV Ventilation Area**. Facilities or areas that are adjacent to a plutonium processing facility, but do not themselves contain any nuclear material (e.g., maintenance shops, offices, locker rooms).

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# APPENDIX A

# BUILDING 707 CLOSURE PROJECT IMPLEMENTATION SCHEDULE

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# APPENDIX B

# SURFACE WATER MANAGEMENT PRACTICES

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# APPENDIX C

# BUILDING 707 CLOSURE PROJECT
# RCRA UNIT-SPECIFIC INFORMATION SHEETS

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# APPENDIX D

# APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) FOR THE BUILDING 707 CLOSURE PROJECT

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# APPENDIX E

# BUILDING 707 CLOSURE PROJECT DECOMMISSIONING OPERATIONS PLAN COMMENT RESPONSIVENESS SUMMARY

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*This appendix will be used by the Building 707 Closure Project team to develop activity-specific surface water management controls for the Building 707 Closure Project. The selected controls will be coordinated with the Site water management program.*

# INTERCEPTOR SWALE

## Description

An interceptor swale is a small v-shaped or parabolic channel, which collects runoff and directs it to a desired location. It can either have a natural grass lining or, depending on slope and design velocity, a protective lining of erosion matting, stone, or concrete.

## Primary Use

The interceptor swale can either be used to direct sediment-laden flow from disturbed areas into a controlled outlet or to direct clean runoff around disturbed areas. Since the swale is easy to install during early grading operations, it can serve as the first line of defense in reducing runoff across disturbed areas. As a method of reducing runoff across the disturbed construction area, it reduces the requirements of structural measures to capture sediment from runoff since the flow is reduced. By intercepting sediment-laden flow downstream of the disturbed area, runoff can be directed into a sediment basin or other BMP for sedimentation as opposed to long runs of silt fence, straw bales, or other filtration methods. Based on site topography, swales can be effectively used in combination with diversion dikes.

## Applications

Common applications for interceptor swales include roadway projects, site development projects with substantial offsite flow impacting the site and sites with a large area(s) of disturbance. It can be used in conjunction with diversion dikes to intercept flows. Temporary swales can be used throughout the project to direct flows away from staging, storage and fueling areas along with specific areas of construction. Note that runoff which crosses disturbed areas or is directed into unstabilized swales must be routed into a treatment BMP such as a sediment basin. Grass lined swales are an effective permanent stabilization technique. The grass effectively filters both sediment and other pollutants while reducing velocity.

## Design Criteria

- Maximum depth of flow in the swale may be 1.5 feet based on a 2-year design storm peak flow. Positive overflow must be provided to accommodate larger storms.
- Side slopes of the swale will be 3:1 or flatter.
- Minimum design channel freeboard will be 6 inches.
- The minimum required channel stabilization for grades less than 2 percent and velocities less than 6 feet per second may be grass, erosion control mats or mulching. For grades in excess of 2 percent or velocities exceeding 6 feet per second, stabilization in the form of high velocity erosion control mats, a three inch layer of crushed stone or rip rap is required. Velocities greater than 8 feet per second will require approval by the local jurisdiction and is discouraged.
- Check dams can be used to reduce velocities in steep swales. See check dam BMP fact sheet for design criteria.
- Interceptor swales must be designed for flow capacity based on the Manning equation to ensure a proper channel section. Alternate channel sections may be used when properly designed and accepted.
- Consideration must be given to the possible impact that any swale may have on upstream or downstream conditions.

- Swales must maintain positive grade to an acceptable outlet.

### Limitations

Interceptor swales must be stabilized quickly after excavation so as not to contribute to the erosion problem they are addressing. Swales may be unsuitable to the site conditions (too flat or steep). Flow capacity should be limited for temporary swales. For permanent swales, the 1.5 feet maximum depth can be increased as long as provisions for public safety are implemented.

### Maintenance Requirements

Inspection must be made weekly and after each significant (0.5 inch or greater) rain event to locate and repair any damage to the channel or to clear debris or other obstructions so as not to diminish flow capacity. Damage from storms or normal construction activities such as tire ruts or disturbance of swale stabilization should be repaired as soon as practical.

## DIVERSION DIKE/BERM

### Description

A diversion dike/berm is a compacted soil mound, which redirects runoff to a desired location. The dike/berm is typically stabilized with natural grass for low velocities and with stone or erosion control mats for higher velocities.

### Primary Use

The diversion dike/berm is normally used to intercept offsite flow upstream of the construction area and direct the flow around the disturbed soils. It can also be used downstream of the construction area to direct flow into a sediment reduction device such as a sediment basin or protected inlet. Alternatively, the diversion dike/berm can be used to contain flow within the construction site if the water is suspected to be contaminated. The diversion dike/berm serves the same purpose and, based on the topography of the site, can be used in combination with an interceptor swale.

### Applications

By intercepting runoff before it has the chance to cause erosion, diversion dikes/berms are very effective in reducing erosion at a reasonable cost. They are applicable to a large variety of projects including site developments and linear projects such as roadways and pipeline construction. Diversion dikes/berms are normally used as perimeter controls for construction sites with large amounts of offsite flow from neighboring properties. Used in combination with swales, the diversion dike/berms can be quickly installed with a minimum of equipment and cost, using the swale excavation as the dike. No sediment removal technique is required if the dike is properly stabilized and the runoff is intercepted prior to crossing disturbed areas.

Significant savings in structural controls can be realized by using diversion dikes to direct sheet flow to a central area such as a sediment basin or other sediment reduction structure if the runoff crosses disturbed areas.

### Design Criteria

- The maximum contributing drainage area should be 10 acres or less depending on site conditions
- Maximum depth of flow at the dike will be 1 foot for 2-year design storm.



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- The maximum width of the flow at the dike will be 20 feet.
- Side slopes of the diversion dike will be 3:1 or flatter.
- Minimum width of the embankment at the top will be 2 feet.
- Minimum embankment height will be 18 inches as measured from the toe of slope on the upgrade side of the berm.
- For velocities less than 6 feet per second, the minimum stabilization for the dike/berm and adjacent flow areas is grass, erosion control mats or mulch. For velocities greater than 6 feet per second, stone stabilization or high velocity erosion control mats should be used. Velocities greater than 8 feet per second must be approved by the local jurisdiction.
- The dikes will remain in place until all disturbed areas that are protected by the dike/berm are permanently stabilized unless other controls are put into place to protect the disturbed area.
- Flow line at dike will have a positive grade to drain to a controlled outlet.

### Limitations

Compacted earth dikes/berms require stabilization immediately upon placement so as not to contribute to the problem they are addressing. The diversion dikes can be a hindrance to construction equipment moving on the site, therefore their locations must be carefully planned prior to installation.

### Maintenance Requirements

Dikes/berms must be inspected on a weekly basis and after each significant (>0.5 inch) rainfall to determine if silt is building up behind the dike, or if erosion is occurring on the face of the dike/berm. Silt will be removed in a timely manner. If erosion is occurring on the face of the dike, the slopes of the face will either be stabilized through mulch or seeding or the slopes of the face will be reduced.

## SILT FENCE

### Description

A silt fence consists of geotextile fabric supported by poultry netting or other backing stretched between either wooden or metal posts with the lower edge of the fabric securely embedded in the soil. The fence is typically located downstream of disturbed areas to intercept runoff in the form of sheet flow. Silt fence provides both filtration and time for sedimentation to reduce sediment and it reduces the velocity of the runoff. Properly designed silt fence is economical since it can be re-located during construction and re-used on other projects.

### Primary Use

Silt fence is normally used as perimeter control located downstream of disturbed areas. It is only feasible for non-concentrated, sheet flow conditions.

### Applications

Silt fence is an economical means to treat overland, non-concentrated flows for all types of projects. Silt fences are used as perimeter control devices for both site developments and linear (roadway) type projects. They are most effective with coarse to silty soil types. Due to the potential of clogging, silt fence should not be used with clay soil types. In order to reduce the length of silt fence, it should be placed adjacent to the down slope side of the construction activities.

### Design Criteria

- Fences are to be constructed along a line of constant elevation (along a contour line) where possible.
- Maximum slope adjacent to the fence is 1:1.
- Maximum distance of flow to silt fence should be 200 feet or less.
- Maximum concentrated flow to silt fence will be 1 CFS per 20 feet of fence.
- If 50% or less of soil, by weight, passes the U.S. Standard sieve No. 200, select the equivalent opening size (E.O.S.) to retain 85% of the soil.
- Maximum equivalent opening size will be 70 (#70 sieve).
- Minimum equivalent opening size will be 100 (#100 sieve)
- If 85% or more of soil, by weight, passes the U.S. Standard sieve No. 200, silt fences will not be used due to potential clogging.
- Sufficient room for the operation of sediment removal equipment will be provided between the silt fence and other obstructions to maintain the fence.
- The ends of the fence will be turned upstream to prevent bypass of stormwater.

### Limitations

Minor ponding will likely occur at the upstream side of the silt fence resulting in minor localized flooding. Fences, which are constructed in swales or low areas subject to concentrated flow, may be overtopped resulting in failure of the filter fence. Silt fences subject to areas of concentrated flow (waterways with flows > 1 cfs) are not acceptable. Silt fence can interfere with construction operations; therefore planning of access routes onto the site is critical. Silt fence can fail structurally under heavy storm flows, creating maintenance problems and reducing the effectiveness of the system.

### Maintenance Requirements

Inspections should be made on a weekly basis, especially after large storm events. If the fabric becomes clogged, it should be cleaned or if necessary, replaced. Sediment should be removed when it reaches approximately one-half the height of the fence.

## STRAW BALE DIKE

### Description

A straw bale dike is a temporary barrier constructed of straw bales anchored with wood posts, which is used to intercept sediment-laden runoff generated by small-disturbed areas. The straw bales can serve as both a filtration device and a dam/dike device to treat and redirect flow. Bales can consist of hay or straw in which straw is defined as best quality straw from wheat, oats or barley, free of weed and grass seed and hay is defined as straw which includes weed and grass seed.

### Primary Use

A straw bale dike is used to trap sediment-laden storm runoff from small drainage areas with relatively level grades, allowing for reduction of velocity thereby causing sediment to settle out.

### Applications

Straw bale dikes are used to treat flow after it leaves a disturbed area on a relatively small 1-acre) site. Due to the limited life of the straw bale, it is cost effective for small projects of a short duration. The limited weight and strength of the straw bale makes it suitable for small, flat (< 2 percent slope) contributing drainage areas. Due to the problems with straw degradation and the lack of uniform quality in straw bales, their use is discouraged except for small applications.

Straw bales may also be used as check dams for small watercourses such as interceptor swales and borrow ditches. Due to the problems in securely anchoring the bales, only small watercourses can effectively use straw bale check dams.

### Design Criteria

- Straw bale dikes are to be constructed along a line of constant elevation (along a contour line).
- Straw bale dikes are suitable only for treating sheet flows across grades of 2% or flatter.
- Maximum contributing drainage area will be 0.25 acre per 100 linear feet of dike.
- Maximum distance of flow to dike should be 100 feet or less.
- Dimensions for individual bales will be 30 inches minimum length, 18 inches minimum height, 24 inches minimum width and will weigh no less than 50 pounds when dry.
- Each straw bale will be placed into an excavated trench having a depth of 4 inches and a width just wide enough to accommodate the bales themselves.
- Straw bales will be installed in such a way that there is no space between bales to prevent seepage.
- Individual bales will be held in place by at least two wooden stakes driven a minimum distance of 6 inches below the 4 inch excavated trench to undisturbed ground, with the first stake driven at an angle toward the previously installed bale.
- The ends of the dike will be turned upgrade to prevent bypass of stormwater.
- Place bales on sides such that bindings are not buried.

### Limitations

Due to a short effective life caused by biological decomposition, straw bales must be replaced after a period of no more than 3 months. During the wet and warm seasons, however, they must be replaced more frequently as is determined by periodic inspections for structural integrity.

Straw bale dikes are not recommended for use with concentrated flows of any kind except for small check flows in which they can serve as a check dam. The effectiveness of straw bales in reducing sediment is very limited. Improperly maintained, straw bales can have a negative impact on the water quality of the runoff.

### Maintenance Requirements

Straw bales will be replaced if there are signs of degradation such as straw located downstream from the bales, structural deficiencies due to rotting straw in the bale or other signs of deterioration. Sediment should be removed from behind the bales when it reaches a depth of approximately 6 inches.

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# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 1 | 707.1 | Container Storage Module A | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Room type area – Room 100 |
| **Unit Boundaries and Interfaces:** | The container storage area is typically around glovebox 70; however, the entire module must be included in the boundary as containers were relocated as necessary to accommodate operations. |
| **EPA Waste Codes:** | D004-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001, F002, F005-F007, F009<br>This unit was not used to store liquid wastes. |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination, by decontamination, or by removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 2 | 707.1 | Container Storage Module B | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Room type area – Room 105 |
| **Unit Boundaries and Interfaces:** | The container storage area is typically the northeast corner of the module; however, the entire module must be included in the boundary as containers were relocated as necessary to accommodate operations. |
| **EPA Waste Codes:** | D004-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001, F002, F005-F007, F009<br>Unit was not used to store liquid wastes. |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination, by decontamination, or by removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |



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# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 3 | 707.1 | Container Storage Module C | To Be Permitted | To Be Activated |

| | |
|---|---|
| **Unit Description:** | Room type area – Room 110 |
| **Unit Boundaries and Interfaces:** | The container storage area boundary is the entire module. |
| **EPA Waste Codes:** | D004-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001, F002, F005-F007, F009<br>Unit was not used to store liquid wastes. |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination, by decontamination, or by removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 4 | 707.1 | Container Storage Module D | To Be Permitted | To Be Activated |

| | |
|---|---|
| **Unit Description:** | Room type area – Room 115 |
| **Unit Boundaries and Interfaces:** | The container storage area boundary is the entire module. |
| **EPA Waste Codes:** | D004-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001, F002, F005-F007, F009<br>Unit will not be used to store liquid wastes. |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination, by decontamination, or by removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 5 | 707.1 | Container Storage Module E | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Room type area – Room 120 |
| **Unit Boundaries and Interfaces:** | The container storage area is typically south of Glovebox 65, between Gloveboxes 55 and 45 and south of Glovebox 25; however, the entire module must be included in the boundary as containers were relocated as necessary to accommodate operations. |
| **EPA Waste Codes:** | D004-D011, F001, F002, F005<br>This unit is only used to store ash material. |
| **Closure Method:** | This unit will be "clean closed" by decontamination or removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 6 | 707.1 | Container Storage Module F | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Room type area – Rooms 125 and 126 |
| **Unit Boundaries and Interfaces:** | The walls in each room define the container storage boundaries. |
| **EPA Waste Codes:** | D004-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001, F002, F005-F007, F009<br>Unit was not used to store liquid wastes. |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination, by decontamination, or by removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 7 | 707.1 | Container Storage Module G | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Room type area – Room 130 (except for the northeast corner), Room 130A, Room 130B, Room 131 (except for the west side of the room), Room 132, Room 132A, Room 133, and Room 133A. |
| **Unit Boundaries and Interfaces:** | The walls in each room define the container storage boundaries, except for the exceptions listed above. |
| **EPA Waste Codes:** | D004-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001, F002, F005-F007, F009<br>Unit was not used to store liquid wastes. |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination, by decontamination, or by removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 9 | 707.1 | Container Storage<br>Module J, Oil Storage Racks | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Room type area – Room 140, Oil Storage Racks |
| **Unit Boundaries and Interfaces:** | The container storage area is typically around inside the oil storage racks; however, the entire northwest side of the module (excluding J Closet) must be included in the boundary as containers were relocated as necessary to accommodate operations. |
| **EPA Waste Codes:** | D001-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001-F003, F005-F007, F009 |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination, by decontamination, or by removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 12 | 707.1 | Container Storage<br>Rooms 167, 169, 171, 175, 179, and 180 | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Room type areas – Rooms 167, 169, 171, 175, 179, and 180 |
| **Unit Boundaries and Interfaces:** | The container storage area is typically the three shelf storage racks for cans; however, the entire room must be included in the boundary as containers were relocated as necessary to accommodate calorimetry operations. |
| **EPA Waste Codes:** | D004-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001, F002, F005-F007, F009<br>Unit is not used to store liquid wastes. |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination, by decontamination, or by removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 12 | 707.1 | Container Storage Room 181 | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Room type area – Room 181 |
| **Unit Boundaries and Interfaces:** | The container storage area is the area inside the shielding wall. |
| **EPA Waste Codes:** | D004-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001, F002, F005-F007, F009<br>Unit is not used to store liquid wastes. |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination, by decontamination or by removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 12 | 707.1 | Container Storage Room 182 | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Room type area – Room 182 |
| **Unit Boundaries and Interfaces:** | The container storage area is the entire room |
| **EPA Waste Codes:** | D004-D011, F001, F002, F005<br>Unit is used to store only ash material. |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination, by decontamination or by removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 12 | 707.1 | Container Storage Room 183 | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Room type area – Room 183 |
| **Unit Boundaries and Interfaces:** | The container storage area is inside the shielding wall. |
| **EPA Waste Codes:** | D004-D011, F001, F002, F005<br>Unit is used to store only ash material. |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination, by decontamination or by removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 12 | 707.1 (90.58) | Container Storage Room 196 | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Room type area – Room 196 |
| **Unit Boundaries and Interfaces:** | The container storage area is the entire room. |
| **EPA Waste Codes:** | D001-D012, D015-D019, D021-D029, D033, D035-D038, D040-D043, F001-F003, F005-F007, F009, U227 |
| **Closure Method:** | This unit will be "clean closed" by decontamination or removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 1 | 707.1 | Container Storage, Module A<br>Gloveboxes A-25, A-30, A-35, A-45, and A-55 | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Glovebox type area |
| **Unit Boundaries and Interfaces:** | Glovebox A25 = Heat head rack – glove ports 001-003, the three glove ports south of the center line – both sides<br>Glovebox A30 = Heat head rack – glove ports 016-021, the six glove ports on the west side of the glovebox<br>Glovebox A35 = Heat head rack – glove ports 001-003, the three glove ports south of the center line – both sides<br>Glovebox A45 = Heat head rack – glove ports 001-003, the three glove ports south of the center line – both sides<br>Glovebox A55 = Heat head rack – glove ports 001-003, the three glove ports south of the center line – both sides |
| **EPA Waste Codes:** | D006<br>Only used to store IDC 0H61 – duct holdup material. |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination, by decontamination, or by removal. |
| **Waste Disposal:** | Heat head racks will be removed and gloveboxes will be size reduced (if necessary) and packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 1 | 707.3A | Salt Stabilization Process, Module A Gloveboxes A-70, A-75, A-80, A-85, A-90, A-100, A-120, A-125, and Furnaces | Permitted | Never Activated |

| | |
|---|---|
| **Unit Description:** | Salt stabilization in gloveboxes. |
| **Unit Boundaries and Interfaces:** | Gloveboxes A-70, A-75, A-85, A-90, A-100, A-120, A-125 and furnaces. |
| **EPA Waste Codes:** | D003 |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination or by removal. |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 3 | 90.146 | Container Storage Module C, Glovebox C-40 | Not subject to RCRA Regulation | Withdrawn |

| | |
|---|---|
| **Unit Description:** | Glovebox type area |
| **Unit Boundaries and Interfaces:** | The container storage area is the entire glovebox, to the center line. |
| **EPA Waste Codes:** | NA |
| **Closure Method:** | This unit was never used to store hazardous waste. The unit was withdrawn on 10/26/94. |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 10 | 90.147 | Container Storage<br>Module K, Glovebox K-45 | Not Subject to RCRA Regulation | Withdrawn |

| | |
|---|---|
| **Unit Description:** | Glovebox type area |
| **Unit Boundaries and Interfaces:** | The container storage area is the entire glovebox, to the center line. |
| **EPA Waste Codes:** | NA |
| **Closure Method:** | This unit was never used to store hazardous waste. The unit was withdrawn on 10/26/94. |
| **Waste Disposal:** | NA |



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# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 7 | 90.105 | Container Storage<br>Module G, Room 130B | Not Subject to RCRA Regulation | Withdrawn |

| | |
|---|---|
| **Unit Description:** | Room type area |
| **Unit Boundaries and Interfaces:** | The container storage area is the entire room. |
| **EPA Waste Codes:** | NA |
| **Closure Method:** | This unit was never used to store hazardous waste. The unit was withdrawn on 10/26/94. |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 8 | 90.75 | Container Storage<br>Module H Vault, Room 136 | Not Subject to RCRA Regulation | Withdrawn |

| | |
|---|---|
| **Unit Description:** | Vault type area |
| **Unit Boundaries and Interfaces:** | The container storage area is the entire vault. |
| **EPA Waste Codes:** | NA |
| **Closure Method:** | This unit was never used to store hazardous waste storage. The unit was withdrawn on 10/26/94. |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 8 | 90.76 | Container Storage Module H, Cage | Not Subject to RCRA Regulation | Withdrawn |

| | |
|---|---|
| **Unit Description:** | Room type area |
| **Unit Boundaries and Interfaces:** | The container storage area is the entire caged area. |
| **EPA Waste Codes:** | NA |
| **Closure Method:** | This unit was withdrawn on 10/26/94. |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 9 | 90.74 | Container Storage<br>Module J, J-Vault, Room 141 | Interim Status | Not in Active Use |

| | |
|---|---|
| **Unit Description:** | Vault type area |
| **Unit Boundaries and Interfaces:** | The container storage area is the entire vault. |
| **EPA Waste Codes:** | TBD |
| **Closure Method:** | Clean closure by documenting the absence of contamination, by decontamination, or by removal. |
| **Waste Disposal:** | Concrete rubble will be managed in accordance with the RSOP for Recycling Concrete or packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 9 | 90.98 | Container Storage<br>Module J Closet, Room 142 | Not Subject to RCRA Regulation | Withdrawn |

| | |
|---|---|
| **Unit Description:** | Vault type area |
| **Unit Boundaries and Interfaces:** | The container storage area is the entire vault. |
| **EPA Waste Codes:** | NA |
| **Closure Method:** | This unit was withdrawn on 11/8/94. |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 9 | 92.020 | Pu Stabilization Unit<br>Module J, Glovebox J-25 | Interim Status | Never Activated |

| | |
|---|---|
| **Unit Description:** | Glovebox type area |
| **Unit Boundaries and Interfaces:** | The container storage area is the entire glovebox, to the center line. |
| **EPA Waste Codes:** | NA |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination. |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 3 | 92.021 | Pu Stabilization Unit<br>Module J, Glovebox J-60 | Interim Status | Never Activated |

| | |
|---|---|
| **Unit Description:** | Glovebox type area |
| **Unit Boundaries and Interfaces:** | The container storage area is the entire glovebox, to the center line. |
| **EPA Waste Codes:** | NA |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination. |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 12 | 90.27 | Container Storage C and D Halls | Not Subject to RCRA Regulation | Withdrawn |

| | |
|---|---|
| **Unit Description:** | Room type area |
| **Unit Boundaries and Interfaces:** | The container storage area is bounded by the corridor walls. |
| **EPA Waste Codes:** | NA |
| **Closure Method:** | This unit was never used to store hazardous waste. The unit was withdrawn on 10/26/94. |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 12 | 90.77 | Container Storage<br>G Corridor Cage | Not Subject to RCRA Regulation | Withdrawn |

| | |
|---|---|
| **Unit Description:** | Room type area |
| **Unit Boundaries and Interfaces:** | The container storage area is the entire corridor cage. |
| **EPA Waste Codes:** | NA |
| **Closure Method:** | This unit was never used to store hazardous waste. The unit was withdrawn on 10/26/94. |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 1 | 90.59 | Container Storage Module C, C-Cell | No Longer Subject to RCRA Regulation | Closed |

| | |
|---|---|
| **Unit Description:** | Room type area |
| **Unit Boundaries and Interfaces:** | The container storage area is the entire room. |
| **EPA Waste Codes:** | NA |
| **Closure Method:** | This unit was "clean closed" by decontamination (5/20/96). |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 12 | 90.60 | Container Storage<br>G and E Halls | No Longer Subject to RCRA Regulation | Closed |

| | |
|---|---|
| **Unit Description:** | Room type area |
| **Unit Boundaries and Interfaces:** | The container storage area is bounded by the corridor walls. |
| **EPA Waste Codes:** | NA |
| **Closure Method:** | This unit was "clean closed" by decontamination (5/20/96). |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 12 | 90.61 | Container Storage F and G Halls | No Longer Subject to RCRA Regulation | Closed |

| | |
|---|---|
| **Unit Description:** | Room type area |
| **Unit Boundaries and Interfaces:** | The container storage area is bounded by the corridor walls. |
| **EPA Waste Codes:** | NA |
| **Closure Method:** | This unit was "clean closed" by decontamination (5/20/96). |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 3 | 92.001 through 92.019 | C-Pit Oil Storage Tanks V-100, V-30, V-31, V-1, V-12, V-13, V-14, V-15, V-16, V-17, V-18, V-19, V-2, V-3, V-4, V-5, V-6, V-7, and V-8 | Mixed Residue | RCRA Stable |

| | |
|---|---|
| **Unit Description:** | The C-Pit Tank System is an organic waste tank system that was used to collect waste oils from the Building 707 foundry, casting, and product assembly operations. Various solvents, including 1,1,1 Trichloroethane (1,1,1 TCE) and carbon tetrachloride ($CCl_4$) were used in these operations as cleaning agents. Freon (Freon 113) was also used for density determinations. Waste oil, machine coolant, 1,1,1 TCE, Freon 113 and $CCl_4$ were gravity drained to tanks located in the basement of the building. The system consists of three major parts: the gravity drain system, tank storage, and waste filtration and transfer system.<br><br>Gravity Drain System: The gravity drain system consists of drain lines in Modules A, B, C, D, E, J, and K. Five main drain lines enter C-Pit: the drain line from Modules A and B, the drain line from Modules J and K (never used), and separate drain lines from Modules C, D and E. All these drain lines are interconnected in a common drain header in C-Pit prior to entering one of the storage tank banks, either V-1 through V-8 or V-12 through V-19. The attached table identifies the sources of waste into each header and provides reference to the idle equipment number associated with the original source. The drain line from Module E could also be directed to V-100 (a raschig ring tank) rather than to the common drain header for the two banks of pencil tanks (V-1 through V-8 or V-12 through V-19). Sources of waste to these drain lines were various glovebox operations and equipment and included both hazardous waste and non-hazardous waste. Additionally, there is a single pump transfer between equipment in Module G and the gravity drain line in Module E.<br><br>Tank Storage System: During system operation, waste could be stored in any of five locations: the two banks of pencil tanks (V-1 through V-8 or V-12 through V-19), the raschig ring tank V-100, or in one of two annular tanks (V-30 or V-31). All these tanks are located below grade in the area known as C-Pit.<br><br>Tank Filtration and Transfer System: The waste stored in the tank system utilized pumps and filters in gloveboxes C-120 in Module C and a glovebox located in C-Pit. The system allowed for the filtering and transfer of waste between the two pencil tank groups and the other tree tanks. Once the material was filtered sufficiently to remove residual plutonium, the same pumps were used to transfer the material out of Building 707 to Building 774, via Buildings 778 and 777. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 3 | 92.001 through 92.019 | C-Pit Oil Storage Tanks V-100, V-30, V-31, V-1, V-12, V-13, V-14, V-15, V-16, V-17, V-18, V-19, V-2, V-3, V-4, V-5, V-6, V-7, and V-8 | Mixed Residue | RCRA Stable |

**Continued . . .**

| | |
|---|---|
| **Unit Boundaries and Interfaces:** | Modules A, B, and C have ancillary equipment to C-Pit tank system beneath the centerline (drain header), and in overhead (approximately column G6) across to Module A then angled to Building 778. Corridor G contains ancillary equipment from Modules A, B, and C for entrance into C-Pit. Module C contains glovebox C-120, the C-Pit tanks, the transfer system glovebox in C-Pit, and two lines that extends into the 2nd floor. Modules D and E have ancillary equipment to C-Pit Tank system beneath the centerline. Module G has ancillary equipment to C-Pit Tank system in the overhead that travels to drain line beneath Module E centerline. A system diagram is attached. |
| **EPA Waste Codes:** | F001, F002 |
| **Closure Method:** | Clean closure by removal. |
| **Waste Disposal:** | If residual liquids are present, they will be absorbed. The tanks and ancillary equipment will be disposed of as mixed waste. Upon final radiological characterization, the tanks will be packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 3 | 92.001 through 92.019 | C-Pit Oil Storage Tanks V-100, V-30, V-31, V-1, V-12, V-13, V-14, V-15, V-16, V-17, V-18, V-19, V-2, V-3, V-4, V-5, V-6, V-7, and V-8 | Mixed Residue | RCRA Stable |

**Continued . . .**

## C-Pit Waste Oil Tank System
## Waste Sources

| Drain Line | Waste Source | Residual Waste Status | Comments and Idle Equipment Numbers |
|---|---|---|---|
| Module A | GB-A-30 | | |
| | GB-A-90 | | |
| | GB-A-100 | Haz Idle Equipment | 707-0024 |
| | Harwood Press | | Harwood Press |
| | GB-A-110 | | 707-0025 |
| | GB-A-120 | | 707-0026 |
| | GB-A-125 | | 707-0027 |
| Module B | GB-B-20 | Haz Idle Equipment | 707-0068 |
| | GB-B-25 | | 707-0031/69/70 |
| | GB-B-85 | Non-Haz Idle Equipment | 707-0033 Hydroform Press<br>707-0066 Tank |
| | GB-B105 | | 707-0067 |
| Module C | GB-C-20 | | 707-0038/68 |
| | GB-C-25 A&B | Haz Idle Equipment | 707-0039/40&69 |
| | GB-C-30 | | 707-0041 |
| | GB-C-45 A&B | Haz Idle Equipment | 707-0042A/43 |
| | GB-C-60 | | 707-0071 |
| | GB-C-65 A&B | Haz Idle Equipment | 707-44/45 |
| | GB-C-90/110 | | 707-0072 |
| | GB-C-95 | | 707-0034 |
| | GB-C-105 | Haz Idle Equipment | 707-0035 |
| | GB-C-115 | Haz Idle Equipment | 707-0036 |
| | GB-C-120 | Ancillary to C-Pit Tank System | Dedicated drain to C-Pit Drain line. |
| | GB-C-125 | Haz Idle Equipment | 707-0037 |
| Module D | GB-D-20 | | |
| Module E | GB-D-125 | | Located in D Module |
| | GB-E-65 | | |
| | GB-E-125 | | |
| | G-Module Line | | Pump transfer from G Module 707-0093 |
| Module F | No line installed | | May be line in floor. |
| Module J | No Sources | | No Connections in Module |
| Module K | No Sources | | No Connections in Module |

**C-Pit Tank System Drawing**
**(RCRA Units 92.001 through 92.019)**

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 4 | 707.3C | Dry Residues Repackaging Process, Module D, Gloveboxes D-30, D-35, D-40, D-45, D-75, D-90, D-95 and Module F Crusher, Saws, Milling Machine, and Hand Tools | Permitted | Never Activated |

| | |
|---|---|
| **Unit Description:** | The treatment unit was never activated. |
| **Unit Boundaries and Interfaces:** | Gloveboxes D-30, D-35, D-40, D-45, D-75, D-90, D-95 and Module F crusher, saws, milling machine, and hand tools. |
| **EPA Waste Codes:** | D004-D011, D035, F001, F002, F005-F009 |
| **Closure Method:** | This unit will be closed by documenting the absence of contamination. |
| **Waste Disposal:** | NA |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 5 | 707.1 | Container Storage Module E, Gloveboxes E-30, E-55, and E-115 | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Glovebox type area |
| **Unit Boundaries and Interfaces:** | Glovebox E-30 = entire glovebox to the centerline<br>Glovebox E-55 = entire glovebox to the centerline<br>Glovebox E-115 = entire glovebox to the centerline |
| **EPA Waste Codes:** | D004-D011, F001, F002, F005<br>This unit is used to store ash material. |
| **Closure Method:** | This unit will be "clean closed" by removal. |
| **Waste Disposal:** | Gloveboxes will be size reduced (if necessary) and packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 5 | 707.3B | Ash Stabilization Process, Module E, Gloveboxes E-20, E-25, E-30, E-55, E-60, E-65, E-70, E-95, E-105, E-110, E-115, E-125, hammer mill, sieves, and furnaces | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Ash stabilization in gloveboxes |
| **Unit Boundaries and Interfaces:** | Glovebox E20 including hammer mill = entire glovebox to centerline<br>Glovebox E25 = entire glovebox to centerline<br>Glovebox E30 = entire glovebox to centerline (also 707.1)<br>Glovebox E55 = entire glovebox to centerline (also 707.1)<br>Glovebox E60 = entire glovebox to centerline<br>Glovebox E65 = entire glovebox to centerline<br>Glovebox E70 = entire glovebox to centerline<br>Glovebox E95 including sieves = entire glovebox to centerline<br>Glovebox E105 = entire glovebox to centerline<br>Glovebox E110 = entire glovebox to centerline<br>Glovebox E115 = entire glovebox to centerline (also 707.1)<br>Glovebox E125 = entire glovebox to centerline<br>Furnaces = permitted but never installed<br>Chainveyor S7 in Module E |
| **EPA Waste Codes:** | D004-D011, F001, F002, F005<br>This unit was used to treat and store ash material. |
| **Closure Method:** | This unit will be "clean closed" by removal. |
| **Waste Disposal:** | Gloveboxes will be size reduced (if necessary) and packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 9 | 707.1 | Container Storage, Module J, Gloveboxes J-35 and J-55 | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Glovebox type area |
| **Unit Boundaries and Interfaces:** | Glovebox J35 = Heat head racks, glove ports 001-005, the first five glove ports south of the centerline on both sides<br>Glovebox J55 = Heat head racks, glove ports 001-005, the first five glove ports south of the centerline on both sides |
| **EPA Waste Codes:** | D004-D011, F001, F002, F005<br>Glovebox used for sampling of residue material and storage of IDC 0H61. |
| **Closure Method:** | This unit will be "clean closed" by documenting the absence of contamination or by removal. |
| **Waste Disposal:** | Gloveboxes will be size reduced (if necessary) and packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 10 | 707.1 | Container Storage, Module K, Gloveboxes K-65 and K-75 | Permitted | In Active Use |

| | |
|---|---|
| **Unit Description:** | Glovebox type area |
| **Unit Boundaries and Interfaces:** | Glovebox K65 = Heat head racks, glove ports 001-005, the first five glove ports south of the centerline on both sides.<br>Glovebox K75 = Heat head racks, glove ports 001-005, the first five glove ports south of the centerline on both sides. |
| **EPA Waste Codes:** | D006<br>Used to store IDC 0H61, duct holdup material. |
| **Closure Method:** | This unit will be "clean closed" by documenting absence of contamination or removal. |
| **Waste Disposal:** | Heat head racks will be removed and gloveboxes will be size reduced (if necessary) and packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

# Appendix C
# B707 Closure Project
# RCRA Unit Closure Information Sheet

| SET # | RCRA Unit #(s) | Description | Regulatory Status | Closure Status |
|---|---|---|---|---|
| 17 | 40.16 | Laundry Waste Tank T-4 | Interim Status | Not In Active Use |

| | |
|---|---|
| **Unit Description:** | Laundry waste tank. |
| **Unit Boundaries and Interfaces:** | The tank and the associated ancillary equipment in Building 732 |
| **EPA Waste Codes:** | F001-F003, F055, F007-F009 |
| **Closure Method:** | This unit will be "clean closed" by documenting the decontamination activities which took place at the time the tank was taken out of service (i.e., normal discharge of wash and rinse water into the tank and subsequent transfer to Building 374 for processing), (ref. ltr from J.R. Cable, Director of Facility Operations, EG&G Rocky Flats to T.E. Lukow, Director of Waste Management and Environment, DOE, RFFO [93-RF-1254] and associated analytical data). |
| **Waste Disposal:** | If residual liquids are present, they will be absorbed. Upon final radiological characterization, the tanks will be packaged to meet disposal facility WAC. In the event this waste cannot be shipped directly to the approved disposal facility, it will be stored in an approved on-Site storage area until shipment can be scheduled. |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **CLEAN AIR ACT (CAA), 42 USC 7401 *et seq.*** | | | |
| NATIONAL AMBIENT AIR QUALITY STANDARDS<br>• Sulfur Dioxide<br>• Particulate Matter (PM-10 & PM-2.5)<br>• Carbon Monoxide<br>• Ozone<br>• Nitrogen Dioxide<br>• Lead | 5 CCR 1001-14<br>[40 CFR 50] | C | National Ambient Air Quality Standards (NAAQS) define levels of air quality that are deemed necessary, with an adequate margin of safety, to protect the public health. The standards are the basis for air quality regulations that are designed to improve and protect air quality. The Denver metro area is currently considered to be in non-attainment for the PM-10 and carbon monoxide standards.<br><br>Ambient air quality standards are not effluent discharge limitations; they are used in conjunction with air dispersion modeling to establish emission limits that are protective of air quality. |
| COLORADO AIR QUALITY CONTROL COMMISSION (CAQCC) REGULATIONS | 5 CCR 1001<br>[40 CFR 52, Subpart G] | | |
| • Emission Control Regulations for Particulates, Smokes, Carbon Monoxide, and Sulfur Oxides | 5 CCR 1001-3<br>(CAQCC Reg. No. 1) | | |
| ➢ Smoke and Opacity | Section II.A.1 | C | Air pollutant emissions from stationary sources (e.g., fuel-fired pumps, generators, and compressors, process vents/stacks) shall not exceed 20% opacity. |
| ➢ Fugitive Particulate Emissions | Section III.D | A | Technologically feasible and economically reasonable control measures and operating procedures will be employed to reduce, prevent, and control particulate emissions. This will probably not apply until the demolition phase of decommissioning. |
| ▪ Construction Activities<br>▪ Storage and Handling of Material<br>▪ Haul Roads<br>▪ Haul Trucks<br>▪ Demolition Activities<br>▪ Sandblasting Operations | III.D.2(b)<br>III.D.2(c)<br>III.D.2(e)<br>III.D.2(f)<br>III.D.2(h)<br>III.D.2(j) | | |
| • Odor Emissions | 5 CCR 1001-4 | C | Regulation No. 2 prohibits the emission of detectable odors from any single source in |

A - Action-Specific ARAR; C - Chemical-Specific ARAR; L - Location-Specific ARAR; TBC - To Be Considered

# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

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|---|---|---|---|
| **CLEAN AIR ACT (CAA), 42 USC 7401 *et seq.*** | | | |
| | (CAQCC Reg. No. 2) | | excess of the air standards. |
| • Air Pollutant Emission Notices (APEN), Construction Permits and Fees, Operating Permits, and Including the Prevention of Significant Deterioration | 5 CCR 1001-5 (CAQCC Reg. No. 3) | | |
| ➢ APEN Requirements | Part A, Section II | C | An APEN shall be filed with CDPHE prior to construction, modification, or alteration of, or allowing emissions of air pollutants from, any activity. Certain activities are exempted from APEN requirements per specific exemptions listed in the regulation. |
| ➢ Construction Permits, Including Regulations for the Prevention of Significant Deterioration (PDS) | Part B | | |
| ▪ Construction Permits | Section III | C | Construction permits are not required for CERCLA activities; however, substantive requirements that would normally be associated with construction permits will apply. Also, fuel-fired equipment (e.g., generators, compressors) associated with these activities may require permitting. |
| ▪ Non-Attainment Area Requirements | Section IV.D.2 | A/C/L | Even though CERCLA activities are exempt from construction permit requirements, non-attainment area requirements may apply if emissions of certain pollutants exceed certain threshold limits. The requirements include emissions reductions or offsets, and strict emission control requirements. |
| ▪ Prevention of Significant Deterioration Requirements | Section IV.D.3 | A/C/L | Even though CERCLA activities are exempt from construction permit requirements, PSD requirements may apply if emissions of certain pollutants exceed certain threshold limits. The requirements include strict emission control requirements, source impact modeling, and pre-construction and post-construction monitoring. |
| • Standards of Performance for New Stationary Sources | 5 CCR 1001-8 (CAQCC Reg. No. 6) | A | New Source Performance Standards exist for various types of stationary sources. Currently, no standards exist for demolition activities. |
| • Emissions of Volatile Organic Compounds (VOCs) | 5 CCR 1001-9 (CAQCC Reg. No. 7) | | |

A - Action-Specific ARAR; C - Chemical-Specific ARAR; L - Location-Specific ARAR; TBC - To Be Considered

# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **CLEAN AIR ACT (CAA), 42 USC 7401 *et seq.*** | | | |
| ➢ General Requirements for Storage and Transfer of VOCs | Section III.B | A | Applies to the transfer of VOCs to a tank larger than 56 gallons. In such cases, submerged-fill or bottom-fill techniques must be used. |
| ➢ Disposal of VOCs | Section V | A | Prohibits the disposal of VOCs by evaporation or spillage. |
| ➢ Storage and Transfer of Petroleum Liquid | Section VI | A | Regulated storage and transfer of petroleum liquids. |
| • Control of Hazardous Air Pollutants | 5 CCR 1001-10 (CAQCC Reg. No. 8) | | |
| ➢ General Provisions (CAQCC regulation incorporates CFR by reference) | Part A, Subpart A (40 CFR Part 61) | C | Details general provisions that apply to sources subject to National Emission Standards for Hazardous Air Pollutants (NESHAPs). The provisions will apply to all decommissioning activities that are subject to a NESHAP. |
| ➢ National Emission Standard for Beryllium (CAQCC regulation incorporates CFR by reference) | Part A, Subpart C (40 CFR Part 61) | C | Details the regulatory requirements for emissions of beryllium from specific stationary source categories, such as machine shops or incinerators that process beryllium. The requirements may apply to decommissioning activities that include size-reduction of beryllium-containing equipment. |
| ➢ Control of Asbestos | Part B, Section II (40 CFR 61, Subpart M) | C | Applies to asbestos abatement activities. Compliance requires that asbestos inspectors, abatement workers, and abatement project managers are certified in accordance with the regulations. |
| | Section III | C | Details project requirements including notification, permitting, and asbestos abatement work practices. |
| | Section III.B.1.a(i) | C | Requires written notice of demolition activities, regardless of whether asbestos is involved. Notice must be submitted to CDPHE at least 10 working days prior to initiation of demolition activities (form supplied by CDPHE). |
| ➢ Part C, Lead | Section I | C | Applies to activities involving lead emissions (e.g., glovebox size reduction). The emission standard is 1.5 microns per cubic meter of air, averaged over a one-month period. |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **CLEAN AIR ACT (CAA), 42 USC 7401 *et seq.*** | | | |
| • Control of Emissions of Ozone-Depleting Compounds (ODCs) | 5 CCR 1001-19 (CAQCC Reg. No. 15) | C | Applies to activities involving the disassembly or disposal of any refrigeration system or appliance that contains a regulated ozone-depleting compound (ODC). Compliance requirements include having registered and certified technicians recover all regulated ODCs in an approved vessel, by an approved method, prior to disassembly or disposal. |
| NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS | | | |
| • National Emission Standards for Emissions of Radionuclides Other than Radon from DOE Facilities | 40 CFR 61, Subpart H [5 CCR 1001-10, Subpart H] | | |
| ➢ Standard | 61.92 | C/L | Establishes a radionuclide emission standard equal to those emissions that yield an effective dose equivalent (EDE) of 10 mrem/year to any member of the public. The Site complies by using stack effluent discharge data and empirically estimated fugitive emissions in the dose model CAP88-PC for calculating the EDE to the most impacted member of the public to ensure that it does not exceed 10 mrem/year. Also, the perimeter samplers in the Radioactive Ambient Air Monitoring Program (RAAMP) sampler network are utilized to verify compliance with the standard. |
| ➢ Emission Monitoring and Test Procedures | 61.93 | C/A | Establishes emission monitoring and testing protocols required to measure radionuclide emissions and calculate EDEs. This section also requires that radionuclide emissions measurements (i.e., stack monitoring) be made at all release points that have a potential to discharge radionuclides into the air which could cause an EDE to the most impacted member of the public in excess of 1% of the standard (i.e., 0.1 mrem/year). |
| ➢ Compliance Monitoring and Reporting | 61.96 | C/L | Requires the Site to perform radionuclide air emission assessments of all new and modified sources. For sources that exceed the 0.1 mrem/year EDE threshold (controlled), the appropriate applications for approval must be submitted to EPA and CDPHE. Additional substantive requirements may be imposed by EPA and/or CDPHE. |
| **FEDERAL WATER POLLUTION CONTROL ACT (aka Clean Water Act [CWA]), 33 USC 1251 *et seq.*** | | | |
| WATER QUALITY CRITERIA – GOLD BOOK | 33 USC 1314 (Clean Water Act, Section | C | The "Gold Book" presents guidelines with respect to water quality criteria for toxic pollutants. Criteria are published for aquatic and human health. The water quality |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **FEDERAL WATER POLLUTION CONTROL ACT (aka Clean Water Act [CWA]), 33 USC 1251 *et seq.*** | | | |
| | 304) | | criteria are not promulgated standards; however, they are established guidelines used for developing National Pollutant Discharge Elimination System (NPDES) permits and may be considered potentially relevant and appropriate. Water quality criteria should not be used as effluent limits, rather discharge limits should be established either through the NPDES or underground injection control (UIC) permitting process.<br><br>Although water criteria are non-promulgated and non-enforceable standards, Section 121(d)(2)(B)(I) of CERCLA as implemented by the National Contingency Plan (NCP) (40 CFR 300.430(e)(2)(I)(E)) specifies that water quality criteria established under Sections 303 and 304 of the Clean Water Act (CWA) shall be attained where relevant and appropriate under the circumstances of the release. The designated or potential use of the surface or groundwater, the environmental media affected, the purpose for which the water quality criteria were developed, and the latest information are to be considered in determining the relevance and appropriateness of the water quality criteria to the response action. Therefore, the need to comply with water quality criteria as a relevant and appropriate requirement needs to be determined on a case-by-case basis using the factors listed above. |
| COLORADO BASIC STANDARDS AND METHODOLOGIES FOR SURFACE WATER | 5 CCR 1002-31 | C | Refer to RFCA Attachment 5 for surface water action levels and standards. |
| COLORADO BASIC STANDARDS FOR GROUNDWATER | 5 CCR 1002-41 | C | Refer to RFCA Attachment 5 for ground water action levels. |
| TOXIC POLLUTANT EFFLUENT STANDARDS<br>• Toxic Pollutants | 40 CFR 129.4 | C | If the permitted point is used, the NPDES permit discharge standards will be met. |
| • Compliance | 40 CFR 129.5 | | |
| NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM REGULATION | | A | These subparts apply to the storage and use of products that contain toxic and hazardous pollutants above reportable quantity limitations, at a facility covered by an NPDES permit. In decision documents, identify and protect all connections to the |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **FEDERAL WATER POLLUTION CONTROL ACT (aka Clean Water Act [CWA]), 33 USC 1251 *et seq.*** | | | |
| • Designation of Hazardous Substances | 40 CFR 116 | | sanitary collection system. |
| • Determination of Reportable Quantities for Hazardous Substances | 40 CFR 117 | | |
| • Applicability of Best Management Practices | 40 CFR 125.102 | | |
| • Best Management Practices Programs | 40 CFR 125.104 | | |
| DISCHARGES OF DREDGED OR FILL MATERIAL INTO WATERS OF THE UNITED STATES | 33 USC 1344<br>33 CFR 3233.3 | | |
| • Discharges Requiring Permits | 33 CFR 323.3 | A/L | |
| DOE COMPLIANCE WITH FLOODPLAIN/WETLANDS ENVIRONMENTAL REVIEW REQUIREMENTS | 10 CFR 1022 | A/L | |
| • Floodplain/Wetlands Determination | .11 | | |
| • Floodplain/Wetlands Assessment | .12 | | |
| • Applicant Responsibilities | .13 | | |
| **MIGRATORY BIRD TREATY ACT, 16 USC 701 to 715** | | | |
| TAKING, POSSESSION, TRANSPORTATION, SALE, PURCHASE, BARTER, EXPORTATION, AND IMPORTATION OF WILDLIFE AND PLANTS | 50 CFR 10 | A/L | Principally focuses on the taking and possession of birds protected under this regulation. Enforcement is predicated on location of the project and time of the year. Current list of protected birds is kept with the Ecology group. |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **SAFE DRINKING WATER ACT (SDWA), 42 USC 300 *et seq.*** | | | |
| COLORADO PRIMARY DRINKING WATER REGULATIONS | 5 CCR 1003-1, | C | Refer to RFCA Attachment 5 for surface water action levels and standards and groundwater action levels. |
| MAXIMUM CONTAMINANT LEVEL GOALS | 40 CFR 141 | C | Refer to RFCA Attachment 5 for surface water action levels and standards and groundwater action levels. |
| **SOLID WASTE DISPOSAL ACT (aka: Resource Conservation and Recovery Act [RCRA]), 42 USC 6901 *et seq.*; SUBTITLE C: HAZARDOUS WASTE MANAGEMENT (Colorado Hazardous Waste Act, CRS 25-15-101 to -217)** | | | |
| The State of Colorado is authorized to administer portions of the hazardous waste management program (e.g., RCRA) to regulate the generation, treatment, storage, and disposal of hazardous waste within Colorado. As such, the Colorado regulations that are more stringent than the federal counterparts would be applicable to the management of hazardous waste. These regulations may also be relevant and appropriate in situations where a remediation waste is "sufficiently similar" to a RCRA-listed waste (e.g., waste which was generated and disposed of prior to the effective date of regulation) or when the proposed remedial action is similar to a RCRA-regulated activity and would be appropriate to ensure that the activity is protective of human health and the environment. Although the Colorado hazardous waste management regulations are similar to the federal requirements, both the federal and state regulatory citations are provided for reference purposes and to denote that both federal and state requirements were considered in establishing the identifying the ARAR requirement adopted for the remediation of the RFETS. Only substantive portions of the regulations are required under CERCLA actions for onsite activities. The State has not verified that these are the only substantive standards. The final determination is predicated upon an analysis for a specific action. | | | |
| SOLID WASTE DISPOSAL SITES AND FACILITIES<br>• Definitions | 6 CCR 1007-2<br>Section 1.2 | A | "Recyclable materials" means any type of discarded or waste material that is not regulated under Section 25-8-205(1)(e), C.R.S., and can be reused, remanufactured, reclaimed, or recycled. |
| IDENTIFICATION AND LISTING OF HAZARDOUS WASTES | 6 CCR 1007-3, 261<br>[40 CFR 261] | A | |
| GENERATOR STANDARDS | 6 CCR 1007-3 Part 262<br>(40 CFR Part 262) | | |

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| **SOLID WASTE DISPOSAL ACT (aka: Resource Conservation and Recovery Act [RCRA]), 42 USC 6901 *et seq.*; SUBTITLE C: HAZARDOUS WASTE MANAGEMENT (Colorado Hazardous Waste Act, CRS 25-15-101 to -217)** | | | |
| • Hazardous Waste Determinations | .11 | A/C | Persons who generate solid wastes are required to determine if the wastes are hazardous according to 6 CCR 1007-3 Parts 261, 267, 279 [40 CFR Parts 261, 266, and 279]. |
| • Hazardous Waste Accumulation Areas | .34 (a)(1)(i),(ii),(iv, excluding A & B); (a)(3); (a)(4); (c)(1) | A | Persons who accumulate hazardous waste in containers or tanks must manage the waste in a manner that protects human health and the environment. |
| GENERAL FACILITY STANDARDS | 6 CCR 1007-3 Part 264, Subpart B [40 CFR Part 264, Subpart B] | | |
| • Waste Analysis | .13(a) | A | The owner/operator of a facility that stores, treats, or disposes of waste must verify the waste has been characterized adequately. |
| • Security | .14 | A/L | The owner/operator of a facility must prevent unauthorized access. |
| • General Inspection Requirements | .15 (a), (c) | A/L | The owner/operator of a facility must inspect for malfunctions, deteriorations, and releases, and must remedy deficiencies. |
| • Personnel Training Requirements | .16 (a), (b), (c) | A/C | Personnel must be trained. |
| • General Requirements for Ignitable, Reactive, or Incompatible Wastes | .17 (a), (b) | A/C | Wastes will be managed to prevent accidental ignition of ignitable or reactive wastes, or the mixing of incompatible wastes. |
| PREPAREDNESS AND PREVENTION | 6 CCR 1007-3 Part 264, Subpart C [40 CFR 264, Subpart C] | | |
| • Design and Operation of a Facility | .31 | A/C | Facilities must be designed to minimize the potential for fire, explosion, or release of hazardous waste. |
| • Required Equipment | .32 | A/C | Facilities must be equipped with specified equipment to mitigate accidents, should |

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| **SOLID WASTE DISPOSAL ACT (aka: Resource Conservation and Recovery Act [RCRA]), 42 USC 6901 *et seq.*; SUBTITLE C: HAZARDOUS WASTE MANAGEMENT (Colorado Hazardous Waste Act, CRS 25-15-101 to -217)** | | | |
| | | | they occur. |
| • Testing and Maintenance of Equipment | .33 | A/C | Equipment must be maintained. |
| • Access to Communications or Alarm System | .34 | A/L | Employees must have access to emergency communications when managing hazardous waste. |
| • Required Aisle Space | .35 | A | Aisle space must be maintained to allow unobstructed access to emergency personnel and emergency equipment. |
| • Arrangements with Local Authorities | .37 | A/L | The owner/operator must make arrangements with specified local emergency personnel. |
| CONTINGENCY PLAN AND EMERGENCY PROCEDURES | 6 CCR 1007-3 Part 264, Subpart D [40 CFR Part 264, Subpart D] | | |
| • Purpose and Implementation | .51 (b) | A/C | The RFETS Emergency Response Plan incorporates the substantive requirements of the Contingency Plan in the Site's Part B Hazardous Waste Permit. Emergencies such as fire, explosion, or release of hazardous waste must be mitigated immediately. |
| • Emergency Coordinator | .55 | A | A designated employee is responsible for coordinating emergency response actions. |
| • Emergency Procedures | .56 (a-i) | A | |
| MANIFEST SYSTEM, RECORDKEEPING, AND | 6 CCR 1007-3 Part 264, | A | This subpart contains requirements recordkeeping and maintaining the RCRA |

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| REPORTING | Subpart E [40 CFR Part 264, Subpart E] | | operating record |
| GROUNDWATER MONITORING | 6 CCR 1007-3 Part 264, Subpart F [40 CFR Part 264, Subpart F] | A | The substantive portions of the groundwater monitoring ARARs for each CERCLA action will be incorporated into the Integrated Monitoring Plan (IMP). |
| CLOSURE AND POST-CLOSURE | 6 CCR 1007-3 Part 264, Subpart G [40 CFR Part 264, Subpart G] | | |
| • Closure Performance Standards | .111 | A | The owner/operator must close the facility in a manner that protects human health and the environment. |
| • Disposal or Decontamination of Equipment, Structures, or Soils | .114 | A/C | All hazardous wastes and residues of hazardous waste must be disposed or decontaminated. |
| • Post-Closure Care and Use of Property | .117 | A/C | Human health and the environment must be protected after closure is complete if hazardous waste remains at the facility. |
| USE AND MANAGEMENT OF CONTAINERS | 6 CCR 1007-3 Part 264, Subpart I [40 CFR Part 264, Subpart I] | | |
| • Condition of Containers | .171 | A | Containers must be maintained in good condition. |
| • Compatibility of Waste in Containers | .172 | A | Wastes must be compatible with containers. |
| • Management of Containers | .173 | A | Containers must be closed except when adding or removing waste. |
| • Inspections | .174 | A | Containers must be inspected weekly. |

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| • Containment<br>➢ System Design and Operation<br>➢ Ignitable and Reactive Wastes<br>➢ Incompatible Wastes | <br>.175<br>.176<br>.177 | <br>A<br>A<br>A | |
| • Closure | .178 | A | Hazardous wastes and residues of hazardous waste must be removed or decontaminated from the unit and soils. |
| • Air Emission Standards | .179 | A/C | Hazardous wastes must be managed in accordance with Subparts AA, BB, CC, as appropriate. |
| TANK SYSTEMS | 6 CCR 1007-3 Part 264, Subpart J [40 CFR Part 264, Subpart J] | | |
| • Design and Installation of New Tank Systems or Components | .192 (a-f) | A | Tank systems must be designed to maintain their integrity when storing or treating hazardous waste. |
| • Containment and Detection of Releases | .193 (a)(i)(1, 2, 3, 5) | A | Secondary containment must be designed to contain and detect any releases from the tank system. |
| • General Operating Requirements | .194 (a-c) | A | Tank systems must be maintained in good condition to prevent releases to the environment. |
| • Inspections | .195(a-c) | A | Inspections must be conducted to identify any tank system integrity concern. |
| • Response to Leaks or Spills and Disposition of Leaking or Unfit-for-Use Tank Systems | .196 (a-c), (e) | A | |
| • Closure and Post-Closure Care | .197 (a, b) | A | During closure, hazardous waste and hazardous waste residues must be removed from the tank system. |
| • Special Requirements for Ignitable and Reactive Wastes | .198 | A/C | Ignitable or reactive wastes must be managed as specified in this section. |
| • Special Requirements for Incompatible | .199 | A/C | Incompatible wastes must not be introduced into a tank system unless the requirements |

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| **SOLID WASTE DISPOSAL ACT (aka: Resource Conservation and Recovery Act [RCRA]), 42 USC 6901 *et seq.*; SUBTITLE C: HAZARDOUS WASTE MANAGEMENT (Colorado Hazardous Waste Act, CRS 25-15-101 to -217)** | | | |
| Wastes | | | of 264.17(b) are met. |
| • Air Emission Standards | .200 | A/C | All hazardous waste must be managed in accordance with Subparts AA, BB, CC, as appropriate. |
| CORRECTIVE ACTION FOR SOLID WASTE MANAGEMENT UNITS | 6 CCR 1007-3 Part 264, Subpart S, [40 CFR Part 264, Subpart S] | | |
| • Temporary Units | .553 (a-c) | A | Temporary units allow flexibility. Justification for alternative compliance must be included in the RFCA decision document. |
| MISCELLANEOUS UNITS | 6 CCR 1007-3 Part 264, Subpart X [40 CFR Part 264, Subpart X] | | |
| • Environmental Performance Standards | .601 | A | Miscellaneous units must be designed, constructed, operated, and maintained in a manner that protects groundwater, surface water, wetlands, soils, and air. |
| ➢ Monitoring, Analysis, Inspection, Response, Reporting, and Corrective Action | .602 | A | Miscellaneous units must be managed to ensure compliance with 264.15 (inspections), 264.33 (testing and monitoring), 264.101 (corrective action for releases). |
| ➢ Post-Closure Care | .603 | A | Miscellaneous units that are disposal units must meet post-closure care requirements. |
| AIR EMISSION STANDARDS FOR PROCESS VENTS | 6 CCR 1007-3 Part 264, Subpart AA [40 CFR Part 264, Subpart AA] | | Air emission standards contained in these sections must be incorporated into the design of equipment that contains or contacts hazardous waste with organic concentrations equal to or greater than 10 ppm (by weight) |
| • Standards: Process Vents | .1032 | A | |

A - Action-Specific ARAR; C - Chemical-Specific ARAR; L - Location-Specific ARAR; TBC - To Be Considered

# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **SOLID WASTE DISPOSAL ACT (aka: Resource Conservation and Recovery Act [RCRA]), 42 USC 6901 *et seq.*; SUBTITLE C: HAZARDOUS WASTE MANAGEMENT (Colorado Hazardous Waste Act, CRS 25-15-101 to -217)** | | | |
| • Standards: Closed-Vent Systems and Control Devices | .1033 | A | |
| • Test Methods and Procedures | .1034 | A | |
| AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS | 6 CCR 1007-3 Part 264, Subpart BB [40 CFR Part 264, Subpart BB] | A | Air emission standards for equipment leaks must be incorporated into the design of equipment that contains or contacts hazardous waste with organic concentrations equal to or greater than 10 ppm (by weight) according to these sections. |
| • Standards: Pumps in Light Liquid Service | .1052 | A | |
| • Standards: Compressors | .1053 | A | |
| • Standards: Pressure Relief Devices in Gas/Vapor Service | .1054 | A | |
| • Standards: Sampling Connecting Systems | .1055 | A | |
| • Standards: Open-Ended Valves or Lines | .1056 | A | |
| • Standards: Valves in Gas/Vapor or Light Liquid Service | .1057 | A | |
| • Standards: Pumps and Valves in Heavy Liquid Service, Flanges, Other | .1058 | A | |
| • Standards: Delay of Repair | .1059 | A | |
| • Standards: Closed Vent Systems and Control Devices | .1060 | A | |
| • Alternative Standards for Valves in Gas/Vapor Service or in Light Liquid Service: Percentage of Valves Allowed to Leak | .1061 | A | |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **SOLID WASTE DISPOSAL ACT (aka: Resource Conservation and Recovery Act [RCRA]), 42 USC 6901 *et seq.*; SUBTITLE C: HAZARDOUS WASTE MANAGEMENT (Colorado Hazardous Waste Act, CRS 25-15-101 to -217)** | | | |
| • Alternative Standards for Valves in Gas/Vapor Service or in Light Liquid Service: Skip Period Leak Detection and Repair | .1062 | A | |
| • Test Methods and Procedures | .1063 | A | |
| AIR EMISSION STANDARDS FOR TANKS, SURFACE IMPOUNDMENTS, AND CONTAINERS | 6 CCR 1007-3 Part 264, Subpart CC [40 CFR Part 264, Subpart CC] | | Air emission standards must be incorporated into the design of tanks, surface impoundments, and container facilities that store or treat hazardous waste with organic concentrations equal to or greater than 10 ppm (by weight). |
| • Standards: General | .1082 | A | |
| • Waste Determination Procedures | .1083 | A | |
| • Standards: Tanks | .1084 | A | |
| • Standards: Surface Impoundments | .1085 | A | |
| • Standards: Containers | .1086 | A | |
| • Standards: Closed-Vent Systems and Control Devices | .1087 | A | |
| • Inspection and Monitoring Requirements | .1088 | A | |
| CONTAINMENT BUILDINGS | 6 CCR 1007-3 Part 264, Subpart DD [40 CFR Part | | |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **SOLID WASTE DISPOSAL ACT (aka: Resource Conservation and Recovery Act [RCRA]), 42 USC 6901 *et seq.*; SUBTITLE C: HAZARDOUS WASTE MANAGEMENT (Colorado Hazardous Waste Act, CRS 25-15-101 to -217)** | | | |
| | 264, Subpart DD] | | |
| • Design and Operating Standards | .1101(a); (b); (c)(1, 3 (excluding i-iii), and 4); (d); (e) | A | Containment buildings must be designed and operated to prevent releases to the environment. |
| • Closure and Post-Closure Care | .1102 | A | |
| LAND DISPOSAL RESTRICTIONS | 6 CCR 1007-3 Part 268 [40 CFR Part 268] | | LDR determinations must be completed for hazardous waste generated. LDRs apply primarily to off-Site disposal actions proposed as part of the remedial activity. |
| • Dilution Prohibited as a Substitute for Treatment | .3 | A | |
| • LDR Determination (Determination if Hazardous Waste Meets the LDR Treatment Standards) | .7 | A | |
| • Special Rules for Wastes that Exhibit a Characteristic | .9 (a-c) | A | |
| MANAGEMENT OF UNIVERSAL WASTE | 6 CCR 1007-3 Part 273 [40 CFR Part 273] | | |
| • Disposal, Dilution, and Treatment Prohibitions | .31 | A | A large quantity handler of universal waste is prohibited from disposing, diluting, or treating universal waste, except during responses to releases. |
| • Waste Management | .33 | A | |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
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| **SOLID WASTE DISPOSAL ACT (aka: Resource Conservation and Recovery Act [RCRA]), 42 USC 6901 *et seq.*; SUBTITLE C: HAZARDOUS WASTE MANAGEMENT (Colorado Hazardous Waste Act, CRS 25-15-101 to -217)** | | | |
| • Labeling and Marking | .34 | A | Universal waste and the associated accumulation areas must be labeled and marked as defined in this section. |
| • Employee Training | .36 | A | Employees must be trained about waste management requirements and on the emergency procedures according to their responsibilities. |
| • Response to Releases | .37 | A | Universal waste handlers must contain releases of universal wastes, and must manage the resulting waste, as appropriate, in accordance with the hazardous waste regulations. |
| STANDARDS FOR THE MANAGEMENT OF USED OIL | 6 CCR 1007-3 Part 279 [40 CFR Part 279] | | |
| • Used Oil Specifications | .11 | A | Used oil burned for energy recovery must meet the specifications of this section. |
| • Prohibitions | .12 | A | Used oil must not be stored in surface impoundments, be used as a dust suppressant, or burned in unapproved units. |
| • Hazardous Waste Mixing | .21 | A | Used oil must be characterized and managed in accordance with 269.10 of this section. |
| • Used Oil Storage | .22 | A | Used oil must be managed in containers or tanks in a manner that protects human health and the environment. Releases must be cleaned up and steps must be taken to prevent recurrence. |
| • On-Site Burning in Space Heaters | .23 | A | Used oil may be used as a fuel for space heaters if the gases are vented to ambient air and the maximum capacity of the space heater is not more than 0.5 million Btu per hour. |
| SOIL REMEDIATION POLICY DOCUMENT | | | |
| • Colorado Soil Remediation Objectives Policy Document | Published by CDPHE in December 1997 | TBC | Cost effective, site-specific risk-based approach to establishing soil remediation objectives. Would be considered in manner compatible with ALF and RFCA |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

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|---|---|---|---|
| **SOLID WASTE DISPOSAL ACT (aka: Resource Conservation and Recovery Act [RCRA]), 42 USC 6901 *et seq.*; SUBTITLE C: HAZARDOUS WASTE MANAGEMENT (Colorado Hazardous Waste Act, CRS 25-15-101 to -217)** | | | |
| | | | Attachment 10. |
| **SOLID WASTE DISPOSAL ACT (aka: Resource Conservation and Recovery Act [RCRA]), 42 USC 6901 *et seq.*; SUBTITLE I: UNDERGROUND STORAGE TANKS (CRS 20.5-101 TO 20.5-407)** | | | |
| UNDERGROUND STORAGE TANKS | 7 CCR 1101-14<br>[40 CFR Part 280] | | |
| • Performance Standards for New USTs | 3.20; [.20] | A | USTs must be designed, maintained, and operated to prevent releases from the tank system to the environment. |
| • General Operating Requirements | 4.30-4.33; [.30-.33] | A | |
| • Release Detection | 5.40-5.44; [.40-.44] | A | Releases that impact soils or groundwater will be identified as "potential areas of concern," will be added to the ER Ranking List, and will be incorporated into the integrated Site remediation program. |
| • Cleanup of Spills and Overfills | 6.53; [.53] | A | Coordination efforts within CDPHE and the Department of Labor and Employment, Oil Inspection Section, will be accomplished through communication with the LRA. |
| • Initial Response to Spills and Overfills | 7.61 (b-c); [.61 (b-c)] | A | |
| • Initial Abatement Measures | 7.62(a); [.62(a)] | A | |
| • Initial Site Characterization | 7.63(a); [.63(a)] | A | |
| • Free Product Removal | 7.64 (a-c); [.64 (a-c)] | A | |
| • Investigations for Soil and Groundwater | 7.65(a); [.65(a)] | A | |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **SOLID WASTE DISPOSAL ACT (aka: Resource Conservation and Recovery Act [RCRA]), 42 USC 6901 *et seq.*; SUBTITLE I: UNDERGROUND STORAGE TANKS (CRS 20.5-101 TO 20.5-407)** | | | |
| Cleanup | | | |
| • Temporary Closure | 8.70 (a-b); [.70 (a-b)] | A | |
| • Permanent Closure and Changes-in-Service | 8.71(b-c); [.71(b-c)] | A | |
| • Assessing the Site at Closure or Change-in-Service | 8.72; [.72] | A | |
| • Applicability to Previously Closed UST Systems | 8.73; [.73] | A | |
| **ABOVEGROUND STORAGE TANKS (CRS, Title 8, Article 20, Parts 7 and 2; Title 18, Article 25, Part 1)** | | | |
| PERFORMANCE STANDARDS FOR TANKS | | | |
| • Design and Construction of Tanks | AST.31.2 | A | ASTs must be designed, maintained, and operated to prevent releases to the environment. |
| • Location and Installation of Outside ASTs | AST.31.3 | A | |
| • Location and Installation of ASTs in Vaults | AST.31.4 | A | |
| • Normal Venting for ASTs | AST.31.5 | A | |
| • Emergency Relief Venting for Fire Exposure for ASTs | AST.31.6 | A | |
| • Vent Piping for ASTs | AST.31.7 | A | |
| • Tank Openings Other Than Vents for ASTs | AST.31.8 | A | |
| • Installation of Tanks Inside Buildings | AST.31.9 | A | |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **ABOVEGROUND STORAGE TANKS (CRS, Title 8, Article 20, Parts 7 and 2; Title 18, Article 25, Part 1)** | | | |
| • Standards for Piping, Valves, and Fittings | AST.32 | A | |
| OPERATING REQUIREMENTS<br>• Collision Protection<br>• Spill and Overfill Control, Remote Impounding, Secondary Containment | 7 CCR 1101-14, Part 4<br><br>AST.41 (excluding AST.41.1[e]) | <br><br>A | |
| • Operation and Maintenance of Corrosion Protection<br>• Compatibility Requirements for All Tanks<br>• Static Protection for All Tanks<br>• Repairs Allowed<br>• Out-of-Service, Closure or Change-in-Service | AST.42<br>AST.43<br>AST.44<br>AST.45 (excluding AST.45[b][4])<br>AST.46©(1-5) | A<br>A<br>A<br>A | |
| RELEASE DETECTION | 7 CCR 1101-14, Part 5, AST.5 | A | |
| RELEASE RESPONSE AND CORRECTIVE ACTION<br>• Initial Response<br>• Initial Abatement Measures<br>• Repair or Closure Required | 7 CCR 1101-14, Part 7<br>AST.72(b), (c)<br>AST.73<br>AST.74 | <br>A<br>A<br>A | |
| OIL POLLUTION PREVENTION<br>• Oil Pollution Prevention: Oil Pollution | 7 CCR 1101-14, Part 11<br>AST.112.7 (c), (d), (e)(1-2), | <br>A | A Spill Prevention, Control, and Countermeasures (SPCC) Plan would not be |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **ABOVEGROUND STORAGE TANKS (CRS, Title 8, Article 20, Parts 7 and 2; Title 18, Article 25, Part 1)** | | | |
| Prevention SPCC Plan Requirements | and (e)(4-5) | | specifically required as an ARAR; however, the substantive requirements that are incorporated into and implemented as part of the SPCC plan would be required as an ARAR (e.g., prediction of the direction, rate, and flow of a release from a tank system need not be included in a plan; however, it must be known by facility personnel and management and be available to emergency responders at the facility). |
| **TOXIC SUBSTANCES CONTROL ACT (TSCA), 15 USC 2601 *et seq.* (relating to PCBs)** | | | |
| PCB USE AUTHORIZATION | 40 CFR 761.30 | A | Lists authorized uses and use restrictions for PCBs. |
| MARKING REQUIREMENTS | 40 CFR 761.40 and .45 | A | Contains requirements for labeling PCBs and PCB storage areas. |
| DISPOSAL REQUIREMENTS<br>• Applicability<br>• Disposal Requirements<br>• PCB Remediation Waste<br>• PCB Bulk Product Waste<br>• Disposal of R&D and Chemical Analyses Wastes | <br>761.50<br>761.60<br>761.61<br>761.62<br>761.64 | A | <br>General PCB disposal requirements<br>Disposal requirements. |
| STORAGE REQUIREMENTS FOR PCBs<br>• Facility Criteria<br>• Temporary Storage<br>• Inspections<br>• Container Specifications<br>• PCB Radioactive Waste<br>• Marking<br>• Laboratory Sample Exemption from Manifesting | 40 CFR 761.65 | A | |
| INCINERATION<br>• Liquid PCBs | 40 CFR 761.70 | A | These regulations would only be ARARs for the construction and operation of an on-Site PCB incinerator. It is envisioned that this will not occur. |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **TOXIC SUBSTANCES CONTROL ACT (TSCA), 15 USC 2601 *et seq.* (relating to PCBs)** | | | |
| • Non-Liquid PCBs | | | |
| HIGH EFFICIENCY BOILERS<br>• Operating Requirements | 40 CFR 761.71 | A | These regulations would only be ARARs for on-Site burning of PCB mineral oil dielectric fluid in a boiler. It is envisioned that this will not occur. |
| SCRAP METAL RECOVERY OVENS AND SMELTERS<br>• Operating Requirements | 40 CFR 761.72 | A | These regulations would only be ARARs for on-Site scrap metal recovery or smelting. It is envisioned that this will not occur. |
| TSCA COORDINATED APPROVAL | 40 CFR 761.77 | A | Institutionalizes EPA approval of PCB activities under TSCA when activities are being conducted under another waste management permit or other decision document issued by EPA or pursuant to a State PCB waste management program. |
| DECONTAMINATION STANDARDS AND PROCEDURES<br>• Self-Implementing Decontamination<br>• Measurement-Based Decontamination | 40 CFR 761.79 | A | |
| PCB SPILL CLEANUP POLICY | 40 CFR 761, Subpart G | TBC | |
| PCB SAMPLING AND ANALYSIS<br>• Cleanup site characterization sampling for PCB remediation waste. | 40 CFR Subpart N | A | Characterization requirements for cleanup of PCB remediation waste. |
| • Sampling to verify completion of self-implementing cleanup and on-site disposal of bulk PCB remediation waste and porous surfaces. | 40 CFR Subpart O | A | Not an ARAR unless conducting self-implementing cleanup of PCB remediation waste. |
| • Sampling non-porous surfaces for measurement-based use, reuse, and on-site or off-Site disposal under 761.361(a)(6) and | 40 CFR Subpart P | A | |

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# APPENDIX D - APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

| REQUIREMENT | CITATION | TYPE | COMMENT |
|---|---|---|---|
| **TOXIC SUBSTANCES CONTROL ACT (TSCA), 15 USC 2601 *et seq.* (relating to PCBs)** | | | |
| determination under 761.79 (b)(3).<br>• Self-implementing alternative dextraction and chemical analysis procedures for non-liquid PCB remediation waste samples. | 40 CFR Subpart Q | A | Applicable procedures when using alternatives to required analytical methodology. |
| • Sampling non-liquid, non-metal PCB bulk product waste for purposes of characterization for PCB disposal in accordance with 761.62, and sampling PCB remediation waste destined for off-Site disposal in accordance with 761.61. | 40 CFR Subpart R | A | |
| DECONTAMINATION OF NON-POROUS SURFACES | | | |
| • Double wash/rinse method for decontaminating non-porous surfaces | 40 CFR Subpart S | A | Referenced procedure from 761.79. |
| **BERYLLIUM** | | | |
| CHRONIC BERYLLIUM DISEASE PREVENTION PROGRAM<br>• Definitions<br>• Release criteria<br>• Waste disposal<br>• Warning labels | 10 CFR 850<br>.3<br>.31<br>.32<br>.38 (b-c) | A | Establishes a program to reduce the number of worker currently exposed to beryllium in the course of their work at DOE facilities. The cited sections are followed in relation to determinations of beryllium contamination and release to the public. |

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# Appendix E

## Comment Responsiveness Summary for the Final Draft of the Building 707 Decommissioning Operations Plan

| Reviewer | Comment No. | Sec/ Page/Para | Comment Description | Comment Resolution |
|---|---|---|---|---|
| BRMFLD | A | General | Broomfield wants to ensure the 707 DOP is a job-specific plan that addresses the detail of decommissioning operations, which will protect human health and the environment both on-site and off-site. | Additional information has been added in the areas of air quality, surface water, and groundwater management, especially with respect to removal of contaminated portions of the building shell, facility demolition, and the use of explosives. Details will be provided in the specific IWCP work packages or other applicable WCDs, which will be subject to LRA review. The IWCP process is described in Section 4.1 of the DOP. In addition, major work activities (e.g., removal of contaminated portions of the building shell, facility demolition, and use of explosives) will be discussed with stakeholders before the work is executed. |
| BRMFLD | B | General | More information needs to be provided regarding: (1) the situation in which explosives will be used, (2) the location in which explosives will be used, (3) reasoning why explosives should be used instead of other demolition techniques, and (4) methodologies to be used to prevent the release and control of airborne contamination and fugitive dust. Broomfield requests stakeholders have an opportunity to review and comment on "Explosive Plans," as the information becomes available. Any anticipated use of explosives must be detailed within the 707 DOP along with the reasoning. | The following language has been added to Section 4.3.6, Explosives:<br>*"The use of explosives will be evaluated for effects on worker health and safety and the environment, and for cost-effectiveness as compared to mechanical demolition techniques. The safety and economic evaluations will be documented in the Project AR File. Due to the age and condition of some of the facilities within the Building 707 Closure Project, the use of explosives may be the only safe method of demolition. Prior to initiating any demolition activity involving the use of explosives, the Building 707 Closure Project point of contact (POC) and DOE POC will consult with the LRA POC. If, after considering relative risks, the LRA agrees that the use of explosives is the safest, most protective option, the work will be planned in accordance with the applicable IWCP work package(s). In addition, prior to execution of the planned activity, the Building 707 Closure Project POC and DOE POC will conduct special project status meetings, as necessary to address stakeholder concerns and provide a detailed description of the work, methods to be used, and scheduled date(s)."* |
| BRMFLD | C | General | The 707 DOP is not specific enough to address the potential degradation of surface water. The specific constituents of concern and groundwater plumes are known and should be addressed within the plan. | The following text has been added to Section 4.5.3.7.6, Groundwater Management (and Sections 4.4.7.1 and 4.4.7.2 have been revised to provide additional detail regarding surface water controls):<br>*"The levels of contamination in groundwater surrounding and beneath the footprint of the Building 707 Closure Project vary significantly among the buildings. The principal region of higher levels of groundwater contamination in this area is known as the "Industrial Area Plume. The Industrial Area Plume is believed to result from the migration of* |

# Appendix E

## Comment Responsiveness Summary for the Final Draft of the Building 707 Decommissioning Operations Plan

| Reviewer | Comment No. | Sec/ Page/Para | Comment Description | Comment Resolution |
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| | | | | *contaminants from IHSSs 117.1, 117.2, 157.1, 158, 160, 171, and 182. Its principal constituents are three VOCs: trichloroethene, tetrachloroethene, and carbon tetrachloride."*<br><br>The Industrial Area Plume has its region of highest concentration (exceeding RFCA Tier I groundwater levels) below and west of Building 711. Buildings 711, 711A, and 718 may be located over groundwater that exceeds RFCA Tier II groundwater contamination levels of the above VOCs, as may the central and northeastern sections of Building 707, the central portion of Building 778, and Building 732. Existing data indicate Buildings 708, 707S, 709, and 731 are all outside the area of the plume. The levels of the groundwater surface, and hence of the groundwater VOCs greater than Tier II, are typically located five or more feet below grade. Project personnel planning activities that require excavation or soil disturbance in or adjacent to these areas are aware of the groundwater condition and its potential for contamination of incidental waters and soils removed from these areas.<br><br>It is possible that VOC contamination could "daylight" during excavation activities associated with removal of the below-grade "C-Pit" and the tunnel beneath the 707/776 corridor. Contaminated groundwater may also be encountered during excavation associated with the removal of Buildings 731 and 732. Excavation work associated with the autoclaves in Module H, the Building 707 seismic buttresses, and the laundry waste pit in Building 778 should be sufficiently removed from the plume to be unaffected, although any surfacing groundwater will be appropriately screened and managed in accordance with Section 4.5.3.7.6 of the DOP. The criteria for deactivation and decommissioning (D&D) monitoring wells are established in the Integrated Monitoring Plan (IMP). A decision has been made to install D&D monitoring wells. An evaluation will be performed per the IMP requirements for D&D monitoring wells if it appears that the activities indicate a potential threat to surface water through a groundwater pathway. The determination to conduct the evaluation will be based on data from the monitoring wells, footing drains, and characterization of the Building 707 and 778 Under Building Contamination Sites (UBCs). This determination and any resulting |

# Appendix E

## Comment Responsiveness Summary for the Final Draft of the Building 707 Decommissioning Operations Plan

| Reviewer | Comment No. | Sec/ Page/Para | Comment Description | Comment Resolution |
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| | | | | evaluation will be integrated with the planning of environmental restoration (ER) activities associated with this work.<br><br>The requirements for control of surface water will need to consider the effects of contamination migration from surface IHSSs, UBCs, and other sources of contamination as well migration of contaminated groundwater. In the areas where IHSSs exist or where excavation may expose groundwater, water accumulating in trenches and areas will be presumed contaminated and sampled in accordance with appropriate procedures (e.g., Control and Disposition of Incidental Waters, 1-C91-EPR-SW.01).<br><br>Barriers will be erected and run-off collected and sampled according to appropriate procedures whenever surface water collects under conditions where it may become contaminated due to project activities. These conditions could include precipitation inundating significant areas of disturbed soil, or during demolition or other period when the project may be using water for dust suppression on rubble or disturbed soil. If the water analysis shows elevated readings for volatile organic compounds (VOCs) or other contaminants, the water will be collected and treated as process waste; otherwise the water may be released. There will be additional monitoring of any surface water runoff during these periods at manhole FD-707-4, southeast of Building 707. |
| BRMFLD | D | General | Broomfield requests enhanced air monitoring be performed during demolition of facilities to ensure there are no elevated releases of contaminants to the environment. The City requests enhanced monitoring be performed during the removal of contaminated sections of a facility and during the demolition of a facility. Enhanced air monitoring plans specific to Building 707 need to be defined in the plan. | Enhanced air monitoring will be performed in accordance with the requirements of the IMP, which is currently undergoing major revisions. Enhanced air monitoring requirements will be reviewed with stakeholders prior to being finalized and incorporated into the revised IMP. |
| BRMFLD | E | General | Broomfield feels the 707 DOP should identify the specific methodologies and plans for the demolition planning and execution of the 707 closure project. Mobilization, site preparation, site clean-up, and demobilization are all crucial | Language has been added to Section 4.5.2, Demolition Planning and Execution, to include information regarding mobilization, demolition site preparation, site cleanup, and demobilization. In addition, the following information has been added to a new section, 4.5.3.7.7, Soil |

# Appendix E

## Comment Responsiveness Summary for the Final Draft of the Building 707 Decommissioning Operations Plan

| Reviewer | Comment No. | Sec/ Page/Para | Comment Description | Comment Resolution |
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| | | | activities that need to be identified in within the DOP. Under building contamination (UBC) characterization operations planned during facility decommissioning should be reflected in the DOP. Any source removal not associated with IHSSs, PACs, and/or soils associated with the building addressed as part of the ER RSOP should also be addressed in the 707 DOP to meet the requirements for a PAM for accelerated action under the RFCA (DOE, 1996). | Characterization and Management:<br><br>*"The IHSSs, PACs, and UBC Sites associated the Building 707 Closure Project were considered in the Building 707 RLCR and are described in detail in the Historical Release Report, (Annual Update for the HRR, September, 2000, Appendix 4, Plates 1-4). IHSSs include 118.2, 150.4, and 150.7, clustered principally adjacent to the area north of Building 707 and surrounding Building 778; 123.2, located west of Building 707; and 162, located between Buildings 778 and 732 and also under Buildings 711 and 711A. There are a number of other IHSSs recommended for No Further Action (162, 192, 194, 185, and 150.5). PACs are 700-1115, 700-1103, and 700-1101, associated with Buildings 708, the Building 707 roof, and Building 732, respectively. UBC Sites have been potentially identified for Buildings 707, 778, and 731. The complete characterization of these areas will occur as part of the Industrial Area Sampling and Analysis Plan (IA SAP), when approved."*<br><br>A number of specific decommissioning activities may result in the handling of contaminated soil. Although the interface between piping dispositioned under the Building 707 DOP and under ER is the facility footprint, dispositioning the piping between Buildings 707 and 731, and between Buildings 778 and 732, is a decommissioning project responsibility. Since there are UBC Sites associated with both Buildings 707 and 731, soil disturbance needs to be considered during this work despite the absence of Individual Hazardous Substance Sites (IHSSs) in the area. IHSS 162 as well as PAC 700-1101 are located in the area between Buildings 778 and 732, and need to be considered when dispositioning those waste lines and pipe chase. The disposition of the underground storage tank (UST) associated with PAC 700-1115 will be performed during ER and should not impact the decommissioning activities for Building 708.<br><br>Removal of the "C-Pit" structure, although it will be coordinated with ER activities, is associated with the Building 707 UBC and the Original Process Waste Lines (OPWLs), and may be deep enough to have elevated levels of VOCs from the Industrial Area Plume. All foundation work in the vicinity of Building 778, including the walkways between Building 707 and Building 776, the tunnel beneath the 707/776 corridor, the Building 707 seismic buttresses, and the laundry waste pit in Building 778, are in |

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| | | | | potentially contaminated areas and any disturbed soil will be assumed to be contaminated. The soil in all these areas is mostly covered by asphalt. Since Building 778 is surrounded by IHSSs, is adjacent to Building 776, and is above a UBC and the Industrial Area Plume, decommissioning work will be closely coordinated with both ER and the Building 776/777 Closure Project. Waste soils generated from all decommissioning work at or near Building 778 foundations will be considered contaminated.<br><br>Soil and debris waste generated from work on or near identified IHSSs will be treated in accordance with Site requirements for contaminated soil (e.g., Removal of Contaminated Soil, CO-4036-A). This will include shutdown of work in adverse conditions, specified requirements during daily shutdowns, air monitoring as required, and dampening of soil for dust suppression and contamination control, if required. Potentially contaminated soil will be stockpiled and covered during shutdown periods in an area adjacent to its original location as determined by ER personnel. Depending on contamination levels, the soil will be loaded into appropriate containers for disposition to the appropriate waste facility or stored in a backfill area designated by ER personnel.<br><br>Staging, storage, and/or disposal of soil debris will be consistent with ER requirements, including any controls such as cover, soil stabilization, and fencing. It is anticipated that relatively small quantities of contaminated and non-contaminated soils will be generated during Building 707 decommissioning activities. |
| BRMFLD | 1 | Section 5.4, page 35 | Change the last sentence of the paragraph to read: "The Building 707 Closure Project Manager or designee will discuss any new techniques with the LRA and stakeholders prior to use." | The following sentence has been added to the end of the referenced paragraph:<br><br>*"New techniques will also be discussed with stakeholders at the periodic project status briefings."* |
| BRMFLD | 2 | Section 5.4.1, page 36 | To be consistent with the other D&D documents, the order of the D&D process should reflect the sequence of steps used in previous RFCA Standard Operating Protocols (RSOPs) and the revised 771 DOP, dated September 13, 2000. | The sequence of decommissioning activities has been revised to make it consistent with the RSOP for Component Removal, Size Reduction, and Decommissioning Activities. |

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| BRMFLD | 3 | Section 5.4.3.1, page 49 | The 707 DOP addresses component removal activities associated with the use of excavators, such as backhoes, to remove tanks and/or ancillary lines. The activities may also be associated with the removal of soil within three feet of grade. Broomfield strongly believes this document needs to address in detail how any excavation will control contaminants and prevent the release of contaminants to the environment. The plan should address: (1) identified IHSSs associated with the 707 facility, (2) identify radioactive IHSSs associated with the 707 facility, (3) enhanced air monitoring to be performed during excavation within an IHSS, and (4) water management activities to ensure run-on and run-off are controlled. We want to emphasize the deed for the DOP to be more detailed and address the unique activities associated with the identified Sets within the 707 Cluster. | Please see the responses to Broomfield Comments E, D, and C, above. Excavation activities will be performed in accordance with approved IWCP work packages or other approved WCDs that have been prepared in accordance with the IWCP planning process. This process relies on Site experience and procedures, and includes appropriate criteria for making field decisions regarding worker safety and protection of public health and the environment. |
| BRMFLD | 4 | Section 5.4.3.1.1, page 50 | Define the procedure to be used when using the non-explosive cracking agents. Will the cracking agent be used if the concrete is contaminated? What is the protocol if the bored holes are contaminated? Broomfield feels the size reduction technique needs to be more clearly defined and wants to know where the agent will be utilized. | The decision to use cracking agents will be part of the IWCP planning process. The applicable IWCP work package or other WCD will include the manufacturer's instructions for use of the non-explosive cracking agents, along with a description of the controls that will be placed on the drilling and handling of contaminated concrete. Non-explosive cracking agents do not generate dust or additional wastes and may be used to fracture contaminated concrete. Both the concrete and cracking agent will be characterized and disposed in accordance with the applicable waste management requirements. No additional information is available at this time. |
| BRMFLD | 5 | Section 5.5., page 68 | The 707 DOP needs to add a table similar to the 771 DOP (Table 5) that identifies and "Outbuilding Disposition Summary." Broomfield considers the Pre-Demolition Survey (PDS) Summary, Table 6 of the 707 DOP, to be a crucial tool that needs to be incorporated into | The proposed sequence of decommissioning activities is contained in the Building 707 Closure Project Schedule. Other pertinent information is contained in the RLCR. More detailed information will be included in the PDSR, which will be submitted for review and concurrence by the LRA. |

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| | | | the 707 DOP. The PDS Summary identifies the survey criterion that identifies the nature and extent of radiological and chemical contamination within a facility. Crucial information may be drawn from this document to ensure independent verification surveys may be performed from a percentage of the identified survey units following completion of the PDS. | |
| BRMFLD | 6 | Section 5.5.2, page 69 | The DOP does not mention having an "opacity certified" person on-site during any activity that will generate fugitive dust. The Demolition Plan should identify the air monitoring requirements for fugitive dust emissions and the controls associated with the emissions. An opacity-certified person can only perform documentation of fugitive dust emission. Add opacity-certified professional within the document to the description of qualified personnel for demolition activities. | Per Section II(A)(8) of CAQCC Regulation No. 1, fugitive particulate emissions from excavation activities are exempt from the requirements of Section (II)(A)(I); therefore an opacity-certified person is not required to monitor facility demolition activities. However, fugitive particulate emissions will be controlled in accordance with the Dust Control Plan, as described in Section 4.5.3.7.1, Air Emissions Control. |
| BRMFLD | 7 | Section 5.5.3.6, page 73 | Broomfield is very concerned with the use of explosives for any D&D activity where there is a potential to release radioactive or hazardous constituents. As of today, the RFCA documents have included the use of explosives, but they have not provided specific information requested by the City to use explosives at the Site. The City of Broomfield would like the 707 DOP to address the use of explo9sives in more detail, similar to the 771 DOP. Broomfield understands the use of explosives will still need to be addressed in detail in a Demolition Plan and the IWCP. Broomfield wants to emphasize the need for stakeholder input to review and comment on "explosive plans." Without detailed information, Broomfield cannot support the use of explosives. | Please see the response to Broomfield Comment B, above. The Building Closure 707 Project Manager is committed to providing detailed information to stakeholders prior to using explosives for any part of the Building 707 Closure Project. |

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| BRMFLD | 8 | Section 5.5.3.7.1, page 73 | To be consistent with other D&D documents, change the sentence to read: "Roads may be periodically cleaned with a street sweeper and/or periodically sprayed. | Section 4.5.3.7.1 has been revised, as requested. |
| BRMFLD | 9 | Section 5.6, page 78 | Add "white spaces" to the list of bullets identified with environmental restoration (ER) activities. | Section 4.6 has been revised, as requested. White Space Areas will be sampled, analyzed, and dispositioned in accordance with the Industrial Area Sampling and Analysis Plan (IA SAP). |
| BRMFLD | 10 | Section 6.2.8, page 83 | Tanks in Buildings 731 and 732 will be utilized as flow-through devices to transfer RCRA-regulated and non-RCRA-regulated liquids collected for transfer to Building 374 for treatment. In the previous 707 DOP, it was stated the tanks did not meet the RCRA tank criteria. Broomfield understands the tanks will not be used as storage tanks, but is concerned with the potential for spills that may occur during overflows of liquid. The City is adamant the additional tank management criteria should be identified in the document to ensure the enhanced management requirements are approved and implemented. | "Overfill protection" has been added to the list of tank management requirements in Section 5.2.8. |
| BRMFLD | 11 | Section 6.2.9, page 83 | The RSOP for Recycling Concrete allows the use of concrete or similar debris to be used for backfill. Other construction debris, such as reinforced steel, roofing, or other material will not be used a backfill to contour the land. This section needs to be clarified. In addition, this section needs to identify how and where the management of rubble and debris will be packaged and/or stored. | Section 5.2.9 has been clarified, as requested. Rubble generated during demolition activities will be staged and monitored consistent with the requirements of the RSOP for Recycling Concrete. Demolition debris will be sorted at the Building 707 slab or adjacent area, and the debris suitable for recycling will be piled in the staging area designated for the Protected Area. The location currently envisioned for concrete storage is the area currently occupied by Solar Pond 207C. The rubble pile will be sprayed with a surfactant and monitored for fugitive dust. Silt fences will be added to retain water from the increased pile area resulting from the additional Building 707 rubble. Water runoff from the pile will be collected if it accumulates, and analyzed as required. |

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| BRMFLD | 12 | Table 20, page 91 | Unit 90.74 (Room 141, J-Vault) is identified as a mixed residue unit, which is not in active use, but not RCRA stable. The EPA codes are not identified. Please clarify why the codes are not identified. What is the process for defining the EPA codes and closure of the unit? | Closure of J-Vault in Room 141 is associated with commitments contained in the original Mixed Residue Compliance Order. Prior to incorporation of the mixed residue container storage units into the Site's RCRA Part B Permit, J-Vault was not being used, nor was it intended to be used, to store RCRA-regulated wastes. However, document searches performed in the early 1990s indicated that some waste types that were considered RCRA-regulated at that time may have been stored in the vault. Since it could not be confirmed that RCRA-regulated wastes had never been stored there, the closure requirement was retained but deferred to decommissioning. The unit has never been referred to as "RCRA stable" because the agreement to defer closure to decommissioning preceded the use of the term "RCRA stable."<br><br>A clear basis of the assignment of EPA waste codes to the unit is not available for two reasons: (1) the unit was never managed as a RCRA unit and as such, clear documentation of historical waste storage activities is not available; and (2) significant characterization of residue material has occurred and continues to occur as part of residue processing activities. This has resulted and will continue to result in changes in the waste codes associated with some residues.<br><br>Current EPA waste codes associated with most mixed residues that could have been stored in the unit generally fall into the characteristic "D" codes associated with heavy metals and potentially (but unlikely) materials that would be considered F001, F002, and F005. Closure by decontamination will require sampling for heavy metals and VOCs. this sampling will account for any chemicals of concern associated with these waste forms. |
| BRMFLD | 13 | Table 20, page 92 | If the laundry waste tank is to be clean closed by documentation of previous wash and rinse activities, how will the transferring of RCRA-regulated waste through the tank impact the closure activities of the tank? You should have to perform additional sampling to confirm and ensure the final rinsate meets the closure criteria. If other tanks are used as flow-through devices, | The option to use Laundry Waste Tank T-4 (Building 732) as a flow-through device is included in the DOP because it may provide a better option for disposing of liquid wastes generated during decommissioning activities. At this time, no specific regulated waste stream has been identified. However, as described in Section 5.2.8, prior to use, appropriate tank management requirements, including closure requirements, will be identified and implemented in consultation with the LRA. Tank T-4 has a unique and unclear regulatory history. Additional confirmatory sampling of |

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| | | | what are the plans for their closure? | the tank may be required during in-process characterization, after a detailed review of the available documentation. It is hoped that it will be unnecessary to rinse the tank simply to obtain a sample of the rinsate, thus avoiding the generation of a great deal of liquid waste. |
| BRMFLD | 14 | Section 8.3, page 98 | Broomfield wants to stress the necessity for additional air monitoring during demolition activities at the Site. The City requests enhanced air monitoring be performed during demolition of facilities and during removal of contaminated portions of the facilities to ensure there are not elevated releases of contaminants to the environment. The Air Quality section does not address fugitive dust emissions or opacity requirements. Add additional narrative to address fugitive dust emissions and how they will be controlled. Will there be an opacity-certified person on-site during demolition? Other D&D documents have stated that an opacity-certified person will be on-site. | Enhanced air monitoring will be performed in accordance with the requirements of the IMP, which is currently undergoing major revisions. Enhanced air monitoring requirements will be reviewed with stakeholders prior to being finalized and incorporated into the revised IMP. |
| BRMFLD | 15 | Section 8.4, page 99 | The DOP addresses the removal of aboveground structures, such as cargo containers, which will expose bare ground that will be susceptible to soil erosion and additional surface water flow. The 707 DOP should identify IHSS areas where cargo containers are currently being stored to ensure proper water management practices are implemented when the containers are removed. Again, this DOP should be a specific document to capture activities that may impact human health and the environment. | A description of the IHSSs, PACs, UBCs, and associated soil characterization and soil management activities has been added to Section 4.5.3.7.6, Groundwater Management. The IHSSs north of Building 707 and surrounding much of Building 778 are currently paved with asphalt, so there is little percolation into the groundwater or run-off of contaminated surface water from those areas. There will be minimal erosion from the Building 707 Closure Project area due to the modest grade surrounding the buildings, and there should be minimal impact from the placement or removal of small buildings or cargo containers on the surface or groundwater profiles. Additional information regarding the controls that will be used to protect air and water quality has also been added to Section 4.4.3.1.3. |
| BRMFLD | 16 | Section 8.7, page 100 | How will exposures to workers and to the public be monitored for toxic/hazardous materials? Will there be additional air monitoring for volatile organics? The 707 DOP needs to be specific and identify the potential | Hazards associated with the Building 707 Closure Project are detailed in the RLCR and summarized in Section 4.2.2 of the DOP. Worker and public exposures will be controlled and monitored in accordance with the ISMS, as described in Section 4.1, Work Planning and Execution. Specifically, a Job Hazards Analysis (JHA) is prepared as part of the IWCP |

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| | | | toxic/hazardous materials associated with the facility and surrounding environment. The DOP should identify when, where, and how monitoring of toxic/hazardous substances will be performed. | process. The JHA addresses job hazards, including the toxic and hazardous materials that may be present in the work area. The IWCP work package or applicable WCD is then written to describe how these hazards will be controlled and monitored. |
| WESTMIN | A | Section 5.4.1, page 38, #16 | The City of Westminster is very concerned about removing a contaminated portion of a building shell before the removed portion is decontaminated. All air monitoring and alarm systems will be removed prior to this event occurring. There is no way to ensure that contamination is not becoming airborne and that workers deconstructing the building as well as other onsite workers and off-site communities are not being subjected to fugitive emissions. the DOPs and RSOPs contain very generic information related to this activity. Therefore, the City requests that the LRA require and be supplied full details on any proposed activities to include work package level details. A DOP modification may be necessary for this level of detail. Only after reviewing the completed IWCP and hazards assessment should the LRA consider approval. | The first paragraph of Section 4.4.7, Removal of Contaminated Portions of the Building Shell, has been revised as follows:<br><br>*"It is the intent of DOE and its contractor to decontaminate all contaminated portions of the building shell (i.e., walls, floors, ceilings, roofs, and other structural members) to meet the applicable criteria for unrestricted release demolition in accordance with the RSOP for Facility Disposition. However, in the event the material disposition analysis shows that decontamination will pose a significant risk to workers and/or public health and safety and the environment, or decontamination is not economically feasible, the Building 707 Closure Project POC and DOE POC will consult with the LRA to determine whether the contaminated portion of the shell should be removed prior to demolition. If, after reviewing the applicable survey data and considering the relative risks, the Building 707 Closure Project POC, DOE POC, and the LRA agree that removal is the safest, most protective option, the work will be planned and executed as described in the following paragraphs. In addition, prior to execution of the planned removal activity, the Building 707 Closure Project POC and DOE POC will hold special project status meetings as necessary to address stakeholder concerns and provide a detailed description of the activity, methods to be used, and scheduled date(s)."* |
| WESTMIN | B | Section 5.5.3.6, page 73 | The City of Westminster does not support the use of explosives for any demolition of Category 3 buildings. Fires and other accidents have occurred in these buildings, resulting in a very high probability that plutonium oxides will not be removed in all the nooks, crannies, etc., and will, therefore, become airborne during demolition using explosives. However, the LRA must approve any use of explosives with concurrence from the downwind communities. | The following language has been added to Section 4.3.6, Explosives:<br><br>*"The use of explosives will be evaluated for effects on worker health and safety and the environment, and for cost-effectiveness as compared to mechanical demolition techniques. The safety and economic evaluations will be documented in the Project AR File, along with the qualifications of the selected demolition subcontractor. Due to the age and condition of some of the facilities within the Building 707 Closure Project, the use of explosives may be the only safe method of demolition. Prior to initiating any demolition activity involving the use of explosives, the Building 707 Closure Project point of contact (POC) and the DOE POC will consult* |

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| | | | Full details on demolition activities, to include work packages, must be provided to the Agency. the City of Westminster requests that it be allowed to participate in all discussions leading up to approval of any demolition activity in which the use of explosives is contemplated. | *with the LRA POC. If, after considering relative risks, the LRA agrees that the use of explosives is the safest, most protective option, the work will be planned and executed in accordance with the applicable IWCP work package(s). In addition, prior to execution of the planned activity, the Building 707 Closure Project POC and DOE POC will conduct special project status meetings, as necessary to address stakeholder concerns and provide a detailed description of the planned activity, methods to be used, and scheduled date(s)."* |
| WESTMIN | C | Section 5.5.3.7.1, page 73 | The DOP is incomplete in that it does not discuss project specific air monitoring for the deconstruction of Building 707. Real time air monitors should cover 85% of the area surrounding Building 707 during this activity. Proper air monitoring is very important to our community. the dust control plan is also inadequate in that it states that controlled water sprays may be used and that facility debris may be loaded into waste roll-off containers that will be covered to control fugitive dust emissions, and that roads may be periodically cleaned with a street sweeper. Westminster commented on this section in the initial draft and is dismayed to see that the language has not changed. All MAY language must be changed to WILL to show that there is an intent by Kaiser-Hill to protect the community from fugitive dust during these activities. | Enhanced air monitoring will be performed in accordance with the IMP, which is currently undergoing major revisions. Enhanced air monitoring requirements will be reviewed with stakeholders prior to being finalized and incorporated into the revised IMP. The project-specific Dust Control Plan will describe the specific methods that will be used to control fugitive dust emissions during facility demolition. Although the list of methods contained in Section 5.5.3.7.1 is provided only for example purposes, the MAY language has been changed to WILL, with the caveat that the selected dust suppression methods will be appropriate for the activity being conducted. |
| CDPHE | A | General | In addition to the cities comments discussed at the meeting on November 14, 2000, asking that language be added to those sections dealing with removing contaminated portions of the building shell and utilizing explosives, to specifically indicate that the consultative process will be used and concurrence from the state will be provided prior to initiating such activities, and that additional close-in air monitoring will be | The following language has been added to the Section 4.5.3.6, Explosives, and comparable language has been added to Section 4.4.7, Removal of Contaminated Portions of the Building Shell:<br><br>*"Prior to initiating any demolition activity involving the use of explosives, the Building 707 Closure Project POC and DOE POC will consult with the LRA POC. If, after considering relative risks, the LRA agrees that the use of explosives is the safest, most efficient option, the work will be planned and executed in accordance with the applicable IWCP work packages. In* |

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| | | | performed during demolition activities (to show, at a minimum, that releases of contamination have not occurred during the demolition process). | *addition, prior to execution of the planned demolition activity, the Building 707 Closure Project POC and DOE POC will conduct special project status meetings as necessary to address stakeholder concerns and provide a detailed description of the activity, methods to be used, and scheduled date(s)."* |
| CDPHE | 1 | Section 1.2 | It should be recognized that although RSOPs may be referenced and followed, the specific actions to be performed should be identified in this DOP or other document as identified in this DOP. Please provide a specific schedule for the generation of the PMP. | The following footnote has been added to Section 1.2 to clarify how the various RSOPs will be used by Building 707 Closure Project management and personnel.<br><br>*"Due to timing issues associated with approval of the RSOP for Facility Disposition and RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities, the requirements contained in these two RSOPs have been incorporated directly into this DOP. The RSOP for Recycling Concrete, and RSOP for ER Activities have been incorporated by reference. The RSOP for ER Activities, and any other RSOPs developed throughout the course of decommissioning, will not be invoked until they have been approved by the LRA."* |
| CDPHE | 2 | Section 1.3 | Although the specific closure information and process for Type 1 facilities are not required to be provided, the specific closure activities for Type 1 buildings that may cause interference with or are otherwise relevant to the closure activities for the Type 2 and Type 3 buildings needs to be included as appropriate. | Located to the south of Building 707, the Type 1 facilities are not expected to interfere with decommissioning activities in the Type 2 and Type 3 facilities. In the event a potential interference is discovered, the project schedule will be adjusted accordingly. |
| CDPHE | 3 | Section 2.1 | Please identify or provide some direction as to which parts of the project team are specifically responsible for Beryllium removal, safety, and compliance issues, and implementation of the Chronic Beryllium Disease Prevention Program (CBDPP). | EESH&Q manages IH&S compliance through the Building 707 Project IH&S team, which is responsible for ensuring all safety and health requirements (including beryllium) are met. |
| CDPHE | 4 | Section 4.1 | This may also need to be modified to include air monitoring in accordance with the provisions of 40 CFR 61.32 and 61.34 for Beryllium adjacent to B707 during demolition. | Enhanced air monitoring will be performed in accordance with the requirements of the IMP, which is currently undergoing major revisions. Enhanced air monitoring requirements will be reviewed with stakeholders prior to being finalized and incorporated into the revised IMP. |

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| CDPHE | 5 | Section 4.2 | This needs to be modified to discuss Beryllium contaminated waste. | Section 4.2 states that beryllium contamination is present in Modules F and G of Building 707, and in many of the Building 707 gloveboxes, plenums, piping, and other equipment. |
| CDPHE | 6 | Table 2 | This table should identify the appropriate ISMS program that will be responsible for Beryllium concerns. | The Chronic Beryllium Disease Prevention Program (Chapter 28 of the OS&IH Manual [MAN-072-OS&IHM]) has been added to Table 2. |
| CDPHE | 7 | Section 5.1.7 | If the OS&IH Program is responsible for Beryllium issues then this needs to be indicated in this discussion. Otherwise another section needs to be added to discuss Beryllium. | A second sentence has been added to Section 4.1.7, as follows:<br>*"The Occupational Safety and Industrial Hygiene (OS&IH) Program incorporates the beryllium management standards defined in 29 CFR Parts 1910 and 1926, DOE Regulation 10 CFR 850, and Chapter 28 of the DOE-approved OS&IH Manual (i.e., the Chronic Beryllium Disease Prevention Program [CBDPP])."* |
| CDPHE | 8 | Table 4 | Please provide appropriate reference/basis for the unrestricted release threshold for Beryllium. 0.2 ug/100cm2 is not supported in 10 CFR 850 as the unrestricted release criteria for Beryllium. As such, Beryllium needs to be removed from this Table or an appropriate limit and reference provided. Currently, the unrestricted release criteria for Beryllium appears to be non-detect, utilizing direct sampling techniques. | Table 4 and associated text have been revised to reflect recent discussions between DOE, the contractor, and the LRA. The following language has been added to Section 5.2.6, Waste Containing Beryllium:<br>*"Equipment and other waste items, as defined by 10 CFR 850.31(a), that are removed from beryllium work areas will be managed as beryllium waste. Building structural material and equipment and items from non-beryllium work areas not regulated under 10 CFR 850.31 may be released as non-beryllium-contaminated sanitary waste or recycled (if the waste is not RCRA listed or characteristic waste) and if beryllium concentrations are <0.2 ug/100cm2 based on surface swipes or process knowledge. characterization of facility components (e.g., building structural material, equipment, and other items) is addressed in the DDCP and PDSP. Components determined to be beryllium waste will be placed in sealed containers, labeled as beryllium waste, and disposed at a contractor-approved disposal facility."* |
| CDPHE | 9 | Section 5.4.1 | It is indicated in (1) that RWPs are required to perform work. Please indicate the requirements to perform Beryllium work, and if Beryllium Work Permits (BWPs) are going to be required to perform work in Beryllium contaminated areas. | The Beryllium Self-Audit Checklist and Beryllium Work Form have been added to Item #1 of Section 4.4.1, Overview of the Removal, Size Reduction, and Decontamination Process. |

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| CDPHE | 10 | Section 5.4.1 | It should also be mentioned in (19) that a pre-demolition survey report (PDSR) will be generated and provided to the LRA prior to initiation demolition activities. | Item 20 in Section 4.4.1 has been revised, as requested (Also, please see new Section 4.5.1, Pre-Demolition Survey). |
| CDPHE | 11 | Figure 7 | Beryllium contaminated waste should also be included as a separate waste stream, since it is neither radioactive nor RCRA hazardous waste. | Figure 7 has been revised, as requested. |
| CDPHE | 12 | Section 5.4.7.1 | This section also needs to include an analysis of the potential for release of Beryllium as well as radionuclide and dust assessments. | Section 4.4.7.1, Air Emissions bullet, has been revised, as requested. |
| CDPHE | 13 | Section 5.5.1 | The steps should include the generation of a PDSR, which is to be provided to the LRA for concurrence. | Section 4.5.1, Pre-Demolition Survey, has been added to describe PDS requirements. |
| CDPHE | 14 | Section 5.5.3.7.1 | As indicated above, in addition to the RAAMP network, close-in air samples may need to be collected. The possibility needs to be addressed. | Enhanced air monitoring will be performed in accordance with the requirements of the IMP, which is currently undergoing major revisions. Enhanced air monitoring requirements will be reviewed with stakeholders prior to being finalized and incorporated into the revised IMP. |
| CDPHE | 15 | Section 6.2.6 | Please provide the proper disposal for equipment or articles with beryllium contamination below 0.2 $\mu g/100cm^2$, and if this will be disposed as beryllium contaminated waste per the requirements of 10 CFR 850. | Revised consistent with changes to the RSOP for Facility Component Removal, Size Reduction and Decontamination Activities. |
| CDPHE | 16 | Table 16 | Table 16 may need to be modified to include Beryllium contaminated waste. | Beryllium waste in included in the estimate for LLW. Table 16 has been revised accordingly. |
| CDPHE | 17 | Section 8.3, page 98 | As indicated above, additional close-in air monitoring may need to occur in addition to the existing RAAMP network. This should be recognized and included as a possibility. | Enhanced air monitoring will be performed in accordance with the requirements of the IMP, which is currently undergoing major revisions. Enhanced air monitoring requirements will be reviewed with stakeholders prior to being finalized and incorporated into the revised IMP. |
| E-CARE | 1 | General | Envirocare supports the decision to decommission Building 707. | Noted. |
| E-CARE | 2 | Section 6.2.2.2 | This section mentions that low-level waste is routinely shipped to the Nevada Test Site (NTS) for disposal. In order to fully realize the goal of | As discussed in Section 5.5, wastes generated as a result of facility decommissioning activities will be characterized and packaged in compliance with RFETS waste management procedures, which implement |

# Appendix E

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| Reviewer | Comment No. | Sec/ Page/Para | Comment Description | Comment Resolution |
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| | | | cost effectiveness for decommissioning activities, it is strongly suggested that Envirocare be considered for disposal of low-level decommissioning waste. Using Envirocare as a disposal facility for low-level waste could represent a significant savings not only for disposal costs but for transportation costs as well. | treatment, storage, and disposal facility WAC and DOT packaging requirements. Treatment, storage, and disposal facilities are selected by the contractor (i.e., Kaiser-Hill Environmental Systems and Stewardship) based on periodic environmental assessments, which are performed in accordance with the requirements of the Off-Site Waste Management Program and results are documented in Off-Site Waste Management Facility Use Decisions (FUDs). |
| E-CARE | 3 | General | Envirocare possesses the capability to treat and/or dispose of other waste types from the Building 707 Closure Project, resulting in further significant savings for this project. | Noted. |
| E-CARE | 4 | General | Significant cost savings can be realized when waste management is planned as part of the decommissioning. For example, contaminated equipment and debris often do not require sizing for packaging, transportation and disposal. It is recommended that such planning be performed to realize potential savings. | Noted. |
| E-CARE | 5 | General | Unilateral cost estimates for disposal at Envirocare are often overestimated and unreliable. To ensure cost-effective disposal, pricing should be obtained directly from Envirocare for the specific project. | Noted. |

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| *The following additional changes have been incorporated to align the Building 707 DOP with the RSOP for Facility Component Removal, Size Reduction and Decontamination Activities* | | | | |
| K-H | 1 | Global | | "Building 707 Closure Project Manager or designee" has been replaced with "Building 707 Closure Project point of contact (POC)." |
| K-H | 2 | Section 1.2 | | The following paragraph has been added to the end of Section 1.2 to describe DOE's long-term stewardship activities:<br>*"DOE is currently considering the long-term stewardship issues associated with decommissioning and ER activities, including long-term monitoring to ensure RFCA objectives are being met. Pursuant to a requirement in the Fiscal Year (FY) 2000 National Defense Authorization Act, DOE is preparing a report to Congress providing details on the cost, scope, and schedule of its management and stewardship responsibilities at these facilities. Pursuant to the terms of a settlement agreement reached in 1998, DOE is also preparing a long-term stewardship study, which will examine the institutional and programmatic issues facing DOE at RFETS and other facilities within the DOE Complex. These documents will be placed in the RFETS Reading Rooms when they become available."* |
| K-H | 3 | Section 3.3 | | A paragraph has been added to the end of Section 3.3 to explain that the Site's Integrated Safety Management System (ISMS), described in Section 4.1 of the DOP, will be used throughout the decommissioning process to provide configuration control and minimize the potential for uncontaminated facilities to become contaminated, or decontaminated facilities to be re-contaminated. |
| K-H | 4 | Section 4.0 | | Section 4.0, Applicable or Relevant and Appropriate Requirements (ARARs), has been re-located. The ARARs are now presented toward the end of the document, in Section 8.0. Affected sections and appendices have been re-numbered, accordingly. In addition, a footnote has been added to explain that:<br>*"Certain Colorado Radiation Control Regulations pertaining to decommissioning and environmental releases may be relevant and appropriate to building decommissioning and ER activities, particularly* |

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| | | | | *the cleanup of soils. The parties to RFCA are in the process of negotiating* a final list. The ARARs will be modified, as appropriate, when a final agreement is reached." |
| K-H | 5 | Section 5.1.1 | | This section has been revised to reflect changes in the latest revision to the Integrated Work Control Program (IWCP) Manual. |
| K-H | 6 | Section 5.1.4 | | Section 4.1.4, Nuclear Safety Program, has been revised to clarify the Unreviewed Safety Question process. |
| K-H | 7 | Section 5.1.10 | | Section 4.1.10, Integrated Environmental Management, has been revised to reflect recent changes in the various environmental management organizations. |
| K-H | 8 | Section 5.4.3 | | The first paragraph of Section 4.4.3, Component Removal and Size Reduction Techniques, Hazards, Controls, and Monitoring, has been revised to expand on the definition of "component removal activities," consistent with a recent modification to the Building 776/777 DOP:<br>*"Associated activities may also include removal of:*<br>• *Fixed lead from rooms, gloveboxes, and other equipment (e.g. lead sheeting, glove port, and glove port covers);*<br>• *Loose lead from rooms, gloveboxes, cabinets, and other equipment (e.g., lead bricks, weights);*<br>• *Fixed electronic equipment and circuit boards from rooms and equipment;*<br>• *Loose electronic equipment and circuit boards from equipment and cabinets;*<br>• *Fixed brass and bronze fittings and hardware from building structures, piping, and equipment;*<br>• *Incandescent and fluorescent bulbs from lighting fixtures and cabinets;*<br>• *Batteries from equipment and cabinets; and*<br>• *Empty aerosol cans from rooms and cabinets."* |

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| | | | | In addition, explanatory footnotes have been added regarding underground storage tanks (USTs) and surface contaminated objects (SCO). |
| K-H | 9 | Section 5.4.3.1 | | Section 4.4.3.1, Component Removal and Size Reduction Techniques, has been revised to reflect recent changes in Site-wide plans for installation of the remote operations size reduction system (ROSRS). The new paragraph reads as follows:<br>*"In 1998, the RFETS Technology Steering Committee examined a variety of size reduction techniques for use during decommissioning. Currently, advanced size reduction techniques are being evaluated, including robotics and remote-operated vehicles. As part of this effort, a controlled technology deployment has been initiated to promote worker safety, minimize waste generation, and increase cost effectiveness. Initial efforts were based on soft-sided containment tents in which size reduction activities would be performed. Subsequent efforts have focused on the development and deployment of the hard-sided Inner Tent Demolition Chamber (ITDC). Other size reduction techniques currently under consideration include the Remote operations Size Reduction System (ROSRS) and In-Situ Size Reduction System (ISSRS), which would use mobile robots to perform mechanical and thermal size reduction operations."* |
| K-H | 10 | Section 5.5 | | A new sub-section has been added to Section 4.5, Facility Demolition. Section 4.5.1, Pre-Demolition Survey, provides more detailed information on the PDS, which is conducted to verify the nature and extent of radiological and chemical contamination in a facility. |
| K-H | 11 | Section 6.3 | | Section 5.3.3 has been added to Section 6.3, Management Requirements for Compliance Order Wastes, to describe the management requirements for Site Treatment Plan (STP) wastes. |
| K-H | 12 | Section 7.0 | | Section 6.0, Closure of RCRA-Regulated Units, has been revised as follows:<br>*"All RCRA-regulated units or portions of RCRA-regulated units located within the building will be closed prior to facility demolition. Portions of units located beneath the building slab or outside the building footprint (e.g., valve vaults and underground piping associated with the Building* |

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| | | | | *374 aqueous waste treatment system) will be taken to a RCRA stable configuration during decommissioning and closed in accordance with the ER RSOP."* |
| K-H | 13 | Section 7.1 | | Section 6.1.1 has been revised to reflect recent minor changes in Clean Closure Option #1. These changes were driven by the recent modification to the B771 DOP.<br><br>Old Language: For units having a complete, detailed operating history, clean closure will be demonstrated when the LRA agrees that the following criteria are met:<br>• A visual inspection of the unit and associated ancillary equipment notes an absence of hazardous or mixed waste stains and/or residuals, and<br>• A review of the RCRA Operating Record and building files indicates hazardous or mixed waste was never spilled in the unit, or the LRA agrees the existing documentation demonstrates that all releases were adequately cleaned up (i.e., if a spill did occur, all visible residual liquids and solid wastes were removed and the spill area was decontaminated).<br><br>New language: *"For units having a complete, detailed operating history, clean closure will be demonstrated when the following criteria are met:*<br>*"• A review of the RCRA Operating Record indicates hazardous or mixed waste was never spilled in the unit, or complete documentation exists to demonstrate releases were adequately cleaned up (i.e., if a spill did occur, visible residual liquids and solid wastes were removed and the spill area was decontaminated). This justification requires LRA concurrence.*<br>*"• A visual inspection of the unit and associated ancillary equipment notes the absence of hazardous or mixed waste stains and/or residuals."* |
| K-H | 14 | Section 7.1.2 | | Section 6.1.2, Unit Removal in Conjunction with "Debris Rule" Treatment, has been revised to include a description of the cerium nitrate decontamination process. |
| K-H | 15 | Section 11.0 | | Section 11.0, Comment Responsiveness Summary, has been revised to read as follows:<br><br>*"Responses to public comments received during the formal public comment period, including comments from the regulatory agencies, are documented in Appendix E of this DOP. In addition, Appendix E describes a number of* |

# Appendix E

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| | | | | *changes that have been made to reflect recent revisions in the RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities. These changes are necessary to ensure consistency between this DOP and the RSOP."* |
| K-H | 16 | Appendix A | | The following sentence has been added to the comment section of the beryllium ARARs:<br>*"The cited sections are followed in relation to determinations of beryllium contamination and release to the public."* |
| K-H | 17 | Appendix C | | Minor changes have been made to the RCRA Unit-Specific Closure Information Sheets to reflect recent changes in the Part B Permit and recent decisions regarding the methods to be used to close these units. |

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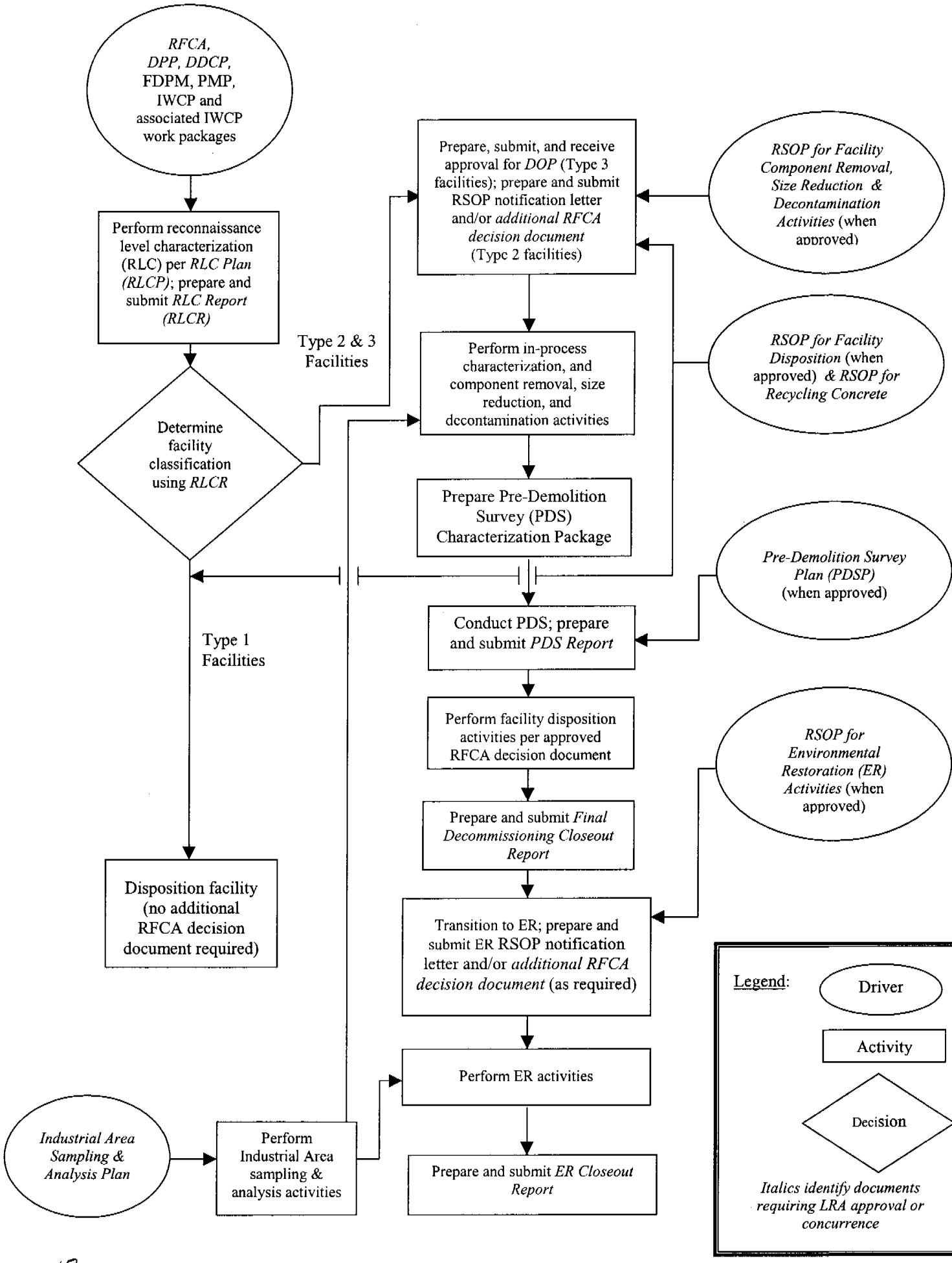
*RFCA, DPP, DDCP,* FDPM, PMP, IWCP and associated IWCP work packages
Perform reconnaissance level characterization (RLC) per *RLC Plan (RLCP)*; prepare and submit *RLC Report (RLCR)*
Determine facility classification using *RLCR*
Type 2 & 3 Facilities
Type 1 Facilities
Disposition facility (no additional RFCA decision document required)
Prepare, submit, and receive approval for *DOP* (Type 3 facilities); prepare and submit RSOP notification letter and/or *additional RFCA decision document* (Type 2 facilities)
*RSOP for Facility Component Removal, Size Reduction & Decontamination Activities* (when approved)
Perform in-process characterization, and component removal, size reduction, and decontamination activities
*RSOP for Facility Disposition* (when approved) *& RSOP for Recycling Concrete*
Prepare Pre-Demolition Survey (PDS) Characterization Package
*Pre-Demolition Survey Plan (PDSP)* (when approved)
Conduct PDS; prepare and submit *PDS Report*
Perform facility disposition activities per approved RFCA decision document
*RSOP for Environmental Restoration (ER) Activities* (when approved)
Prepare and submit *Final Decommissioning Closeout Report*
Transition to ER; prepare and submit ER RSOP notification letter and/or *additional RFCA decision document* (as required)
Perform ER activities
Prepare and submit *ER Closeout Report*
*Industrial Area Sampling & Analysis Plan*
Perform Industrial Area sampling & analysis activities
Legend:
Driver
Activity
Decision
*Italics identify documents requiring LRA approval or concurrence*

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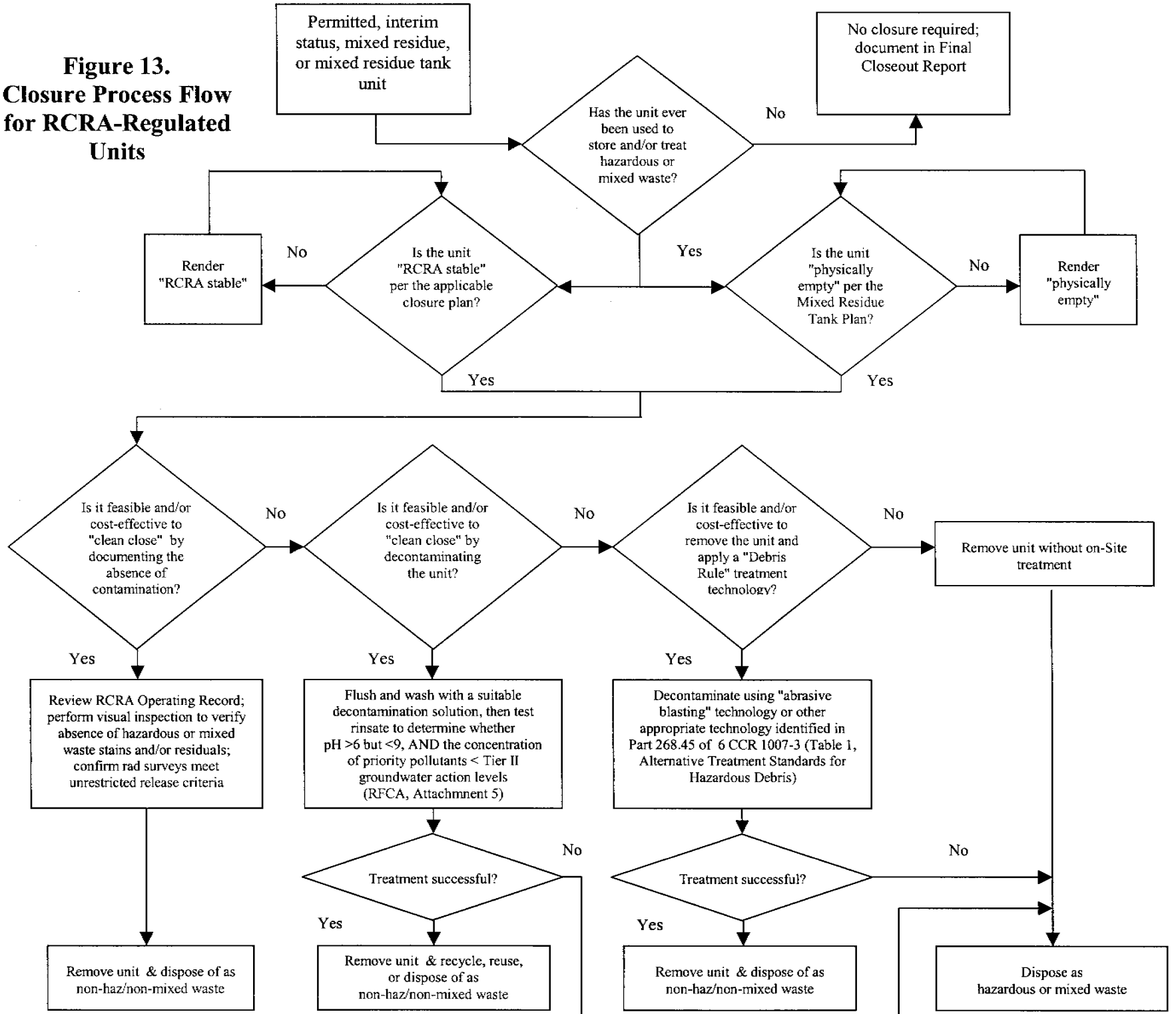
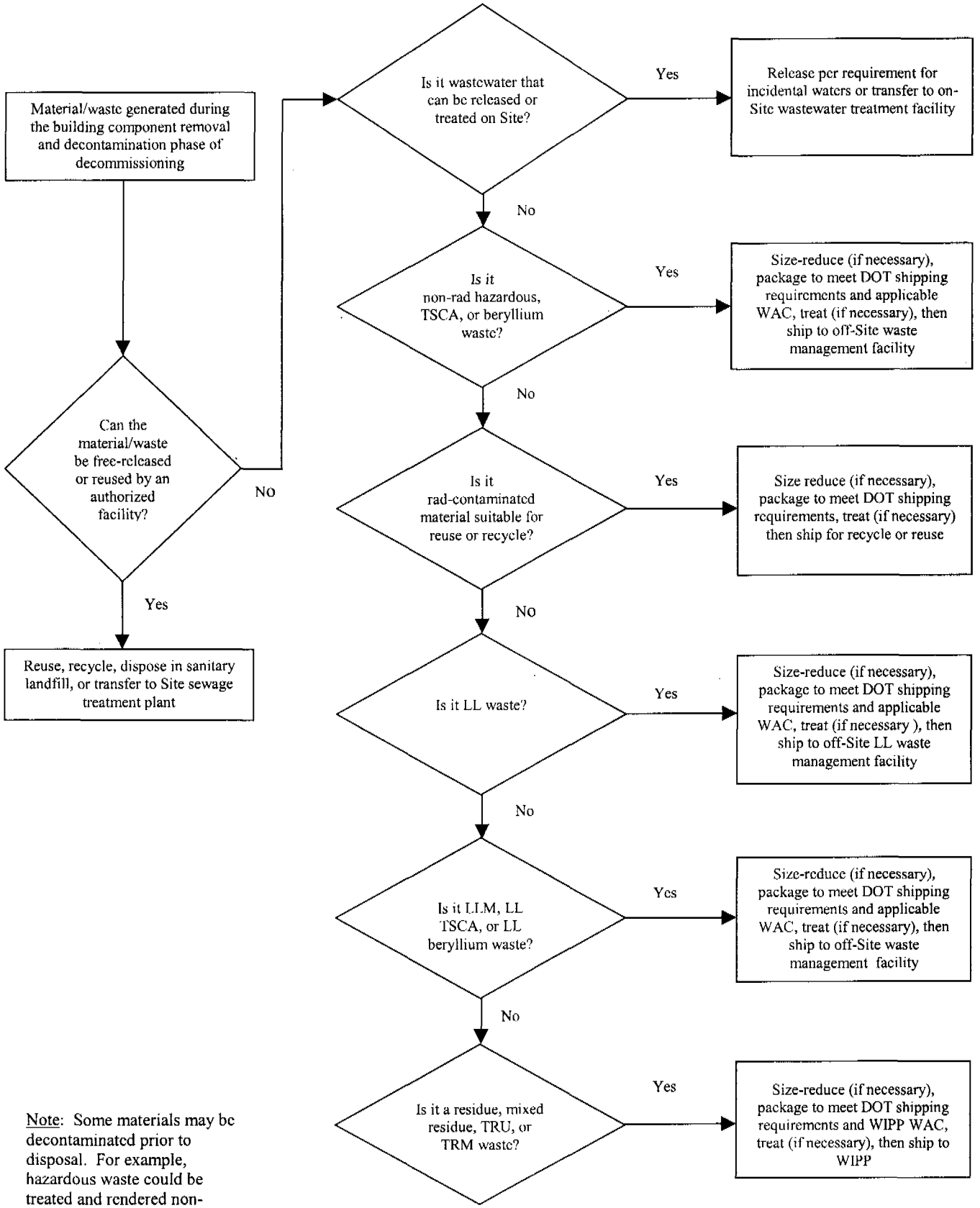
**Figure 13. Closure Process Flow for RCRA-Regulated Units**






Note: Some materials may be decontaminated prior to disposal. For example, hazardous waste could be treated and rendered non-hazardous; LLM waste could be decontaminated and rendered non-rad hazardous waste, and TRU waste may be decontaminated and rendered LL waste.

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**Figure 7. Material Disposition Logic Flow**